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Creating PivotTables and Macros

LEARNING OBJECTIVES

After studying this lesson, you will be able to:

- Create PivotTables and change their fields
- Create PivotCharts from PivotTable or worksheet data
- Set macro security to protect workbook data
- Record and run macros to automate tasks
- Add custom task buttons to worksheets

Excel has many features to help you perform sophisticated data analyses, including the PivotTable and the PivotChart. PivotTables let you summarize worksheet data dynamically to view them in various ways. In this lesson, you will arrange your data with simple drag-and-drop commands and have Excel automatically create summary formulas in the rows and columns. You also will create PivotCharts to achieve the same power and flexibility for charting data. Many Excel workbooks are used on a recurring basis. Examples include monthly expense accounts, sales forecasts, and lists of various types. Often, the same tasks are performed in these workbooks over and over. Excel allows you to create macros to automate repetitive tasks. In addition, Excel lets you assign macros to shortcut keys, buttons on the Quick Access toolbar, and custom buttons or other graphics in a worksheet. In this lesson, you will create macros and custom buttons in an Excel workbook.

Student Resources   labyrinthelab.com/excel10

CASE STUDY

Simplifying Repetitive Tasks

Raritan Clinic East, an incorporated medical practice that serves a patient community ranging in ages from newborn to 18 years, is planning to construct a pediatric oncology facility. In addition, a companion facility will provide temporary housing to physicians specializing in ground-breaking cancer treatments and long-term housing for family members of the children who are receiving treatments. Sandra Chavez-Hall is the chief development officer for the clinic's foundation. She coordinates a fundraising campaign to solicit contributions from private donors, charitable organizations, industry sources, and government grants to build the two facilities. Sandra will use PivotTables and PivotCharts to analyze the contributions by various criteria.

	Row Labels	Sum of Year 1	Sum of Year 2
3			
4	⊟**Level 1**	**117,267,482**	**118,272,625**
5	Corporate Sponsorship	17,460,000	20,300,000
6	Federal Government Grant	49,899,591	47,894,948
7	Individual Sponsorship	12,500,000	15,000,000
8	State Government Grant	37,407,891	35,077,677
9	⊟**Level 2**	**6,254,063**	**7,511,682**
10	Corporate Grant	1,250,000	1,425,000
11	Corporate Sponsorship	250,000	200,000
12	Individual Sponsorship	2,500,000	2,500,000
13	Medical Center/Large Facility	100,000	90,250
14	Medical Ctr Contribution	654,063	596,432
15	Organized Labor/Union Contribution	750,000	700,000
16	Private Grant	750,000	2,000,000
17	⊞**Level 3**	**1,317,583**	**1,204,419**
18	⊞**Level 4**	**202,100**	**85,500**
19	⊞**Level 5**	**58,287**	**109,509**
20	⊞**Level 6**	**15,186**	**6,827**
21	**Grand Total**	**125,114,701**	**127,190,562**

Levels 3–6 are collapsed to display only the subtotals.

The PivotTable shows the contributions organized by sponsor categories within each pledge level. You can easily rearrange the design to view the data in other ways.

Sandra also maintains a contributions-to-date summary report. She uses macros to record the steps used in sorting the data. By attaching each macro to a button on a worksheet, she can sort the report with one click.

	A	B	C	D	E	F	G
1	Raritan Clinic East Pediatric Diagnostic Specialists		Capital Campaign	Insert Sponsor	Sort by Leader		
2							
3	Pledge	Team Leader	Sponsor Category	Sponsor Name	Year 1	Year 2	To Date
4	Level 3	Abbott	Organization Contribution	Child Advocate Society	50,000	50,000	100,000
5	Level 3	Abbott	Organization Contribution	Kelsey Foundation	0	50,000	50,000
6	Level 4	Abbott	Organization Contribution	Hands Across Foundation	20,000	15,500	35,500
7	Level 4	Abbott	Organization Contribution	Chamber of Commerce	10,000	12,500	22,500
8	Level 5	Abbott	Organization Contribution	Accountancy Association	0	15,000	15,000
9	Level 5	Abbott	Organization Contribution	Business Roundtable	0	15,000	15,000

Macros were created to perform repetitive tasks; then they were assigned to buttons in row 1.

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12.1 Creating PivotTables

PivotTables are powerful data analysis tools. They let you summarize data in various ways and instantly change the view you use. You can create normal Excel lists and tables to sort and filter data and produce subtotals. A PivotTable not only subtotals groups of related data, but also goes a step further and compares one group to another. Compared with performing similar data analyses on a standard worksheet, PivotTables offer tremendous speed and flexibility.

Arranging the Source Data

You create PivotTables from columns or from a table in an Excel worksheet. The data should contain no blank rows or columns. Converting a list to a table is recommended when records will be added after the PivotTable is created. The additional table data are included automatically when the PivotTable is refreshed or updated. Data in a list are not included automatically. The following examples explain two PivotTables based on the same worksheet list.

	A	B	C	D	E	F
3	Pledge Level	Team Leader	Sponsor Category	Sponsor Name	Year 1	Year 2
4	Level 5	Abbott	Organization Contribution	Accountancy Association	0	15,000
5	Level 4	Faber	Corporate Sponsorship	Accurate Biomedical	10,000	10,000
6	Level 1	Lemus	Federal Government Grant	Admin for Children & Fam	5,129,874	8,075,333
7	Level 3	Faber	Corporate Sponsorship	Alpha Supplies Corp.	125,000	50,000
8	Level 6	Nguyen	Individual Contribution	Andres Padilla	0	500

The worksheet data on which the sample PivotTables are based

PivotTable Example 1

You could sort the preceding table by pledge level or sponsor category; however, you could not easily compare totals for the various pledge levels in each sponsor category. This is where the PivotTable comes into use. A PivotTable can summarize some or all of the data in any number of ways, and it creates grand totals for you. Each column in a PivotTable is a *field*. Examine the PivotTable and notice that the Sponsor Category field from the table is used for the row labels, the Pledge Level field for the column labels, and the Year 2 field for the data area and grand totals. Each row displays the amount given by each sponsor group in the various pledge levels.

This PivotTable summarizes contributions from all sponsor groups.

Sum of Year 2	Column Labels						
Row Labels	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Grand Total
Corporate Grant		1,425,000.00		0.00			1,425,000.00
Corporate Sponsorship	20,300,000.00	250,000.00	350,000.00	22,500.00	28,750.00		20,951,250.00
Federal Government Grant	47,894,948.00						47,894,948.00
Individual Contribution					4,100.00	2,080.00	6,180.00
Individual Sponsorship	15,000,000.00	2,500,000.00	413,579.00	15,000.00	4,475.00	595.00	17,933,649.00
Local Business Contribution					2,634.00	992.00	3,626.00
Local Government Grant			243,500.00				243,500.00
Medical Center/Large Facility		90,250.00					90,250.00
Medical Ctr Contribution		596,432.00	122,340.00				718,772.00
Organization Contribution				50,000.00	28,000.00	39,050.00	3,160.00	120,210.00
Organized Labor/Union Contribution		700,000.00					700,000.00
Physician Office Contribution			25,000.00	20,000.00	30,500.00		75,500.00
Private Grant		2,000,000.00	0.00				2,000,000.00
State Government Grant	35,077,677.00						35,077,677.00
Grand Total	118,272,625.00	7,561,682.00	1,204,419.00	85,500.00	109,509.00	6,827.00	127,240,562.00

The amount given by each sponsor group is displayed by pledge level.

Filter buttons allow you to sort and filter the sponsor groups and pledge levels.

PivotTables automatically total the rows and columns and calculate a grand total.

PivotTable Example 2

Using the same table data, you may view the data differently—in this case, summarized first by pledge level and then by sponsor category. To create this type of view, the PivotTable layout shown in the following illustration contains the Pledge Level and then Sponsor Category fields for row labels, no column labels, and the Year 2 field for the data area and totals.

This PivotTable layout summarizes contributions first by pledge level and then by sponsor category.

Buttons allow you to collapse and expand the level of detail.

Row Labels	Sum of Year 2
⊟ Level 1	118,272,625
Corporate Sponsorship	20,300,000
Federal Government Grant	47,894,948
Individual Sponsorship	15,000,000
State Government Grant	35,077,677
⊟ Level 2	7,511,682
Corporate Grant	1,425,000
Corporate Sponsorship	200,000
Individual Sponsorship	2,500,000
Medical Center/Large Facility	90,250
Medical Ctr Contribution	596,432
Organized Labor/Union Contribution	700,000
Private Grant	2,000,000
⊞ Level 3	1,204,419
⊞ Level 4	85,500
⊞ Level 5	109,509
⊞ Level 6	6,827
Grand Total	127,190,562

Subtotals are created for each pledge level.

In this lesson, you will learn how to lay out both of these types of PivotTables and much more.

How PivotTables Work

Each area of the PivotTable plays a role in data organization. The PivotTable Field List task pane displays after you define the worksheet range to be used. The areas of the task pane are explained in the following illustration showing the settings for the preceding PivotTable Example 1.

You may choose some or all columns from the worksheet data to appear in the PivotTable.

PivotTable Field List

Choose fields to add to report:
- ☑ Pledge Level
- ☐ Team Leader
- ☑ Sponsor Category
- ☐ Sponsor Name
- ☐ Year 1
- ☑ Year 2

Drag fields between areas below:

▽ Report Filter	⊞ Column Labels
	Pledge Level ▾
⊞ Row Labels	Σ Values
Sponsor Cate... ▾	Sum of Year 2 ▾

You could drag the Pledge Level field to the Report Filter area to filter for one or more pledge level groups rather than display data for every pledge level in the PivotTable.

The Column Labels area contains the pledge levels, one level in each column.

The Row Labels area contains the product names, one sponsor category in each row.

The Values area contains the Year 2 contribution numbers from the worksheet to be calculated using the SUM function.

> **NOTE**
> You must select a cell in the PivotTable to display the PivotTable Field List task pane.

You design a PivotTable by choosing the columns (fields) to be included from the worksheet. Excel initially places all text columns that you choose into the Row Labels area and all selected number columns into the Values area for summing. If this is not your desired layout, you can drag and drop various fields into the correct areas of the task pane. Where you place fields determines how the PivotTable summarizes the data. By choosing different fields or dragging and dropping a field, you may quickly compare data in various ways. You may choose from several functions—such as SUM, COUNT, and AVERAGE—to calculate fields containing values.

QUICK REFERENCE	CREATING A PIVOTTABLE
Task	**Procedure**
Create a PivotTable from a worksheet range or table	■ Select a cell in the worksheet range or table. ■ Choose Insert→Tables→PivotTable 📊 from the Ribbon. ■ Verify the worksheet range or table name in the Create PivotTable dialog box and click OK to place the PivotTable on a new worksheet. ■ In the PivotTable Field List task pane, place a checkmark by each worksheet field to be included in the design, selecting the fields in the order they should appear as row labels and values columns. ■ If necessary, drag and drop a field name to the correct area: Report Filter, Row Labels, Column Labels, or Values.
Name a PivotTable	■ Choose Options→PivotTable, type the name in the PivotTable name text box (spaces are allowed), and tap `Enter`.
Display the PivotTable Field List task pane	■ Select any cell within the PivotTable. ■ If the task pane is turned off, choose Options→Show→Field List from the Ribbon.

DEVELOP YOUR SKILLS 12.1.1

Create PivotTables

The best way to understand the dynamic capabilities of a PivotTable is to create one. In this exercise, you will create PivotTables from a worksheet range and a table.

Review the Worksheet Data

1. Start **Excel** and **open** the Sponsors workbook from the Lesson 12 folder in your file storage location.

2. **Maximize** 🔲 the window.

   The Sponsors Sheet worksheet contains the data you will use to create two PivotTables. Look at the column headings and the various records in the rows. Each record contains data for a specific donor or government grant for the building project. Notice the dollar amounts contained in the Year 1 and Year 2 columns.

Create a PivotTable from a Worksheet Range

You will create a PivotTable that summarizes Year 2 by pledge level with subtotals for each sponsor category (corporation, individual, organization, state government agency, and so on).

3. Select **cell B4**.

You should select a cell within the worksheet range or table before you create the PivotTable. The range should contain no blank rows or columns.

4. Choose **Insert→Tables→PivotTable** 📄 from the Ribbon.

The Create PivotTable dialog box appears.
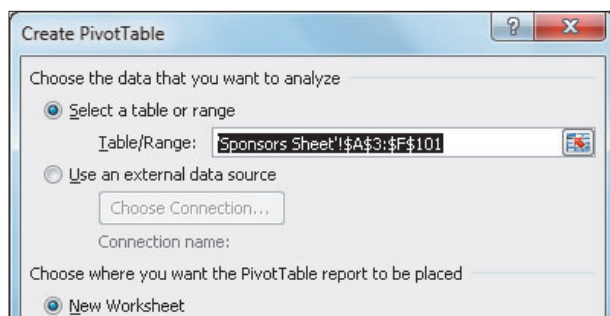
5. Verify the suggested range as shown, notice that the default is to place the PivotTable on a new worksheet, and click **OK**.

A new worksheet appears and contains an empty PivotTable placeholder. The PivotTable Field List task pane also displays. If the task pane is turned off, choose Options→Show→Field List from the Ribbon.

6. **Rename** Sheet1 as `PivotTable by Sponsor Category`.

7. Select **cell A1**, which is outside the boundary of the PivotTable outline.

Notice that the PivotTable Field List task pane disappears. You must select a cell within the PivotTable placeholder to display the task pane.

8. Select **cell A3** within the PivotTable placeholder to restore the task pane.

Notice that the PivotTable Field List task pane contains a list of all the data fields in the worksheet range. You will choose only some of them.

9. Follow these steps to define the PivotTable in the task pane:

Ⓐ **Place a checkmark next to the Pledge Level, Sponsor Category, and Year 2 fields.**
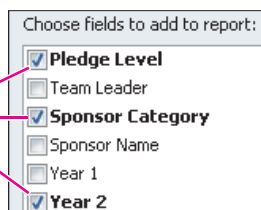
Ⓑ **Drag the Pledge Level field to the Column Labels area.**
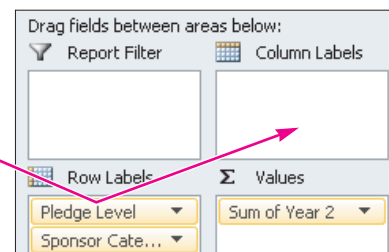
In the resulting PivotTable, notice that the sponsor categories are displayed one per row, the six pledge levels are displayed one per column, and the Year 2 contributions data are summarized with totals for each sponsor category in column H and each pledge level in row 19. The Level 1 label is not aligned over its numbers in cell B4, and you will fix this in a later exercise.

	A	B	C	D	E	F	G	H
3	Sum of Year 2	Column Labels						
4	Row Labels	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Grand Total
5	Corporate Grant		1425000		0			1425000
6	Corporate Sponsorship	20300000	250000	350000	22500	28750		20951250
7	Federal Government Grant	47894948						47894948
8	Individual Contribution					4100	2080	6180
9	Individual Sponsorship	15000000	2500000	413579	15000	4475	595	17933649
10	Local Business Contribution					2634	992	3626
11	Local Government Grant			243500				243500
12	Medical Center/Large Facility		90250					90250
13	Medical Ctr Contribution		596432	122340				718772
14	Organization Contribution			50000	28000	39050	3160	120210
15	Organized Labor/Union Contribution		700000					700000
16	Physician Office Contribution			25000	20000	30500		75500
17	Private Grant		2000000	0				2000000
18	State Government Grant	35077677						35077677
19	Grand Total	118272625	7561682	1204419	85500	109509	6827	127240562

Name the PivotTable

10. Choose **Options→PivotTable** from the Ribbon, type **BySponsorCategory** in the Pivot-Table name text box, and **tap** Enter.

Create a PivotTable from a Worksheet Table

The steps for creating a PivotTable from a worksheet table are the same as for a worksheet range. This time your PivotTable will group the data by pledge level with the sponsor categories in alphabetical order within each pledge level.

11. Display the **Sponsors Table** worksheet in the Sponsors workbook.

12. With any table cell selected, choose **Insert→Tables→PivotTable** from the Ribbon.

13. Verify that the suggested range is the **Sponsors_Table** and click **OK**.

14. **Rename** the new sheet as **PivotTable by Pledge Level**.

15. In the PivotTable Field List task pane, place a checkmark next to field names *in this order:* **Pledge Level, Sponsor Category, Year 2**.

The task pane and the PivotTable results should display as shown. The records are grouped by pledge level with the sponsor categories in alphabetical order within each pledge level. The Year 2 subtotal displays for each pledge level, and a grand total appears at the bottom of the column. With this layout, you did not need to create any column labels.

	Row Labels	Sum of Year 2
3		
4	▢Level 1	118,272,625
5	Corporate Sponsorship	20,300,000
6	Federal Government Grant	47,894,948
7	Individual Sponsorship	15,000,000
8	State Government Grant	35,077,677
9	▢Level 2	7,511,682
10	Corporate Grant	1,425,000
11	Corporate Sponsorship	200,000

Report Filter / Column Labels / Row Labels: Pledge Level, Sponsor Cate... / Σ Values: Sum of Year 2

Name the PivotTable

16. Choose **Options→PivotTable** from the Ribbon, type **By Pledge Level** in the Pivot-Table name text box, and **tap** ⌴Enter⌴.

Notice that you can type a PivotTable name with or without spaces.

17. Save 💾 the changes to your workbook.

Formatting a PivotTable

| Video Lesson | labyrinthelab.com/videos |

Values and subtotals in the PivotTable do not automatically display the formatting from the original worksheet cells. You may set number formatting for a value field. You also may select and format one or more specific cells in the PivotTable. For example, you may align the column labels using commands on the Home tab of the Ribbon. The PivotTable Tools Design contextual tab contains a large selection of PivotTable styles to apply color, shading, and gridlines with one mouse click. The report layout displays in Compact Form by default, or you may choose from two other layouts. The subtotals may be displayed at the top or bottom of each group or hidden.

	A	B
3	Row Labels ▾	Sum of Year 2
4	⊟Level 1	118,272,625
5	Faber	20,300,000
6	Lemus	82,972,625
7	Weinstein	15,000,000
8	⊟Level 2	7,561,682
9	Debowski	700,000

The Compact Form report layout with a PivotTable style applied

	A	B	C
3	Pledge Leve▾	Team Leader ▾	Sum of Year 2
4	⊟Level 1	Faber	20,300,000
5		Lemus	82,972,625
6		Weinstein	15,000,000
7	**Level 1 Total**		**118,272,625**
8	⊟Level 2	Debowski	700,000
9		Faber	200,000

The Tabular Form report layout with filter buttons for each row label field

| QUICK REFERENCE	FORMATTING A PIVOTTABLE
Task	**Procedure**
Apply number formatting to a field	Right-click a column cell in the PivotTable, choose Number Format from the pop-up (context) menu, and choose options from the Format Cells dialog box. (Do not choose the Format Cells command from the context menu, which formats the selection rather than entire columns.)
Change the subtotals or grand totals display	Choose Design→Layout→Subtotals 🔲 or Grand Totals 🔲 and choose an option from the Ribbon.
Apply a PivotTable style	Choose Design→PivotTable Styles and choose a style from the Ribbon.
Apply a report layout	Choose Design→Layout→Report Layout 🔲 and choose the Compact (default), Outline, or Tabular layout from the Ribbon.

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Format a PivotTable

In this exercise, you will format the PivotTables that you created in the previous exercise. You will format selected cells, apply number formatting to values columns, choose a PivotTable style, and explore the report layout choices.
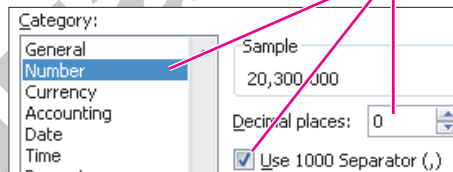
Format PivotTable Data

1. Display the **PivotTable by Sponsor Category** worksheet in the Sponsors workbook.
You may need to use the navigation buttons at the left of the worksheet tabs to bring the desired tab into view.

2. Select the **range B4:H4** and **right-align** the labels to match the number alignment in their columns.

3. Choose **Design→Layout→Grand Totals menu** ▾ from the Ribbon. Experiment by choosing each option and observe its result. Choose **On for Rows and Columns** when you are finished.

4. If necessary, **select** any cell in the PivotTable to redisplay the PivotTable Field List task pane.

5. Follow these steps to format the Year 2 contribution numbers in the PivotTable:

Ⓐ **Right-click** any number in the **range B5:H19,** and choose **Number Format** from the context menu.
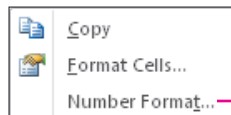
Ⓑ Choose the **Number** category, set **0** decimal places, and place a checkmark in the **Use 1000 Separator (,) box.**

Ⓒ Click **OK.**

Category:
General
Number
Currency
Accounting
Date
Time

Sample
20,300,000

Decimal places: 0

☑ Use 1000 Separator (,)

Copy
Format Cells...
Number Format...

All number columns are displayed with the formatting that you chose because they all are part of the Sum of Year 2 field.

	A	B	C	D
3	Sum of Year 2	Column Labels ▾		
4	Row Labels ▾	Level 1	Level 2	Level 3
5	Corporate Grant		1,425,000	
6	Corporate Sponsorship	20,300,000	250,000	350,000
7	Federal Government Grant	47,894,948		

Apply a PivotTable Style

6. Display the **PivotTable by Pledge Level** worksheet.

7. Choose the **Design→PivotTable Styles→More** ▾ button, scroll through the available styles, and choose **PivotStyle Medium 9**.
This style shades the subtotal rows.

Explore Report Layouts

8. Choose **Design→Layout→Report Layout→Show in Outline Form** from the Ribbon.
This layout divides the Pledge Level and Sponsor Category fields into separate columns. Both column headings display a filter button.

9. Choose **Design→Layout→Report Layout→Show in Tabular Form** from the Ribbon.
This layout displays a subtotal row below its detail rows.

10. Choose **Design→Layout→Report Layout→Show in Compact Form** to return to the original layout.

11. Save ▣ the changes to your workbook.

Changing PivotTable Fields

| **Video Lesson** | labyrinthelab.com/videos |

You may add or remove fields on a PivotTable simply by adding or removing the checkmark next to the field name in the PivotTable Field List task pane. The PivotTable will automatically reconfigure to display the new data. You also may change the order of fields within the row and column areas. One of the most powerful ways of manipulating data is to move a field from the row area to the column area or vice versa. This is called *pivoting the field* (thus the name PivotTable). The display of the data field rotates to give you an entirely different view of your data, as illustrated in the two PivotTables you created in the previous exercise. There, you positioned the Region field to display as columns in the first PivotTable and as rows in the second.

DEVELOP YOUR SKILLS 12.1.3

Change PivotTable Fields

In this exercise, you will add fields to the PivotTable and reorder the display of fields. You also will pivot the view.

Add a Values Field

1. Display the **PivotTable by Pledge Level** worksheet, if necessary.
The PivotTable contains data only for Year 2. Now you will add Year 1.

2. Place a checkmark next to **Year 1** in the task pane to add this field to the PivotTable.
The Year 1 values are summed with subtotals and a grand total. Notice that Excel automatically added a ∑ Values entry in the task pane Column Labels area because the PivotTable now contains two Sum columns.

▽ Report Filter	Ⅲ Column Labels
	∑ Values ▾
Ⅲ Row Labels	∑ Values
Pledge Level ▾	Sum of Year 2 ▾
Sponsor Cate... ▾	Sum of Year 1 ▾
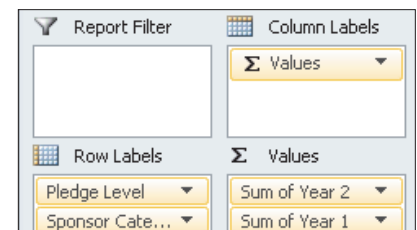
3. **Right-click** any cell in the **Sum of Year 1** column of the PivotTable, and choose **Number Format** from the context menu.

4. In the Format Cells dialog box, choose the **Number** category, set **0** decimal places, place a checkmark in the **Use 1000 Separator (,)** box, and click **OK**.

5. Repeat **steps 3 and 4** to format the **Sum of Year 2** column.

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Reorder Fields

6. **Drag** Sum of Year 2 below Sum of Year 1 in the Values area.
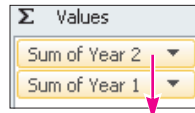
3	Row Labels	▼	Sum of Year 1	Sum of Year 2
4	⊟**Level 1**		**117,267,482**	**118,272,625**
5	Corporate Sponsorship		17,460,000	20,300,000
6	Federal Government Grant		49,899,591	47,894,948
7	Individual Sponsorship		12,500,000	15,000,000
8	State Government Grant		37,407,891	35,077,677
9	⊟**Level 2**		**6,254,063**	**7,561,682**
10	Corporate Grant		1,250,000	1,425,000
11	Corporate Sponsorship		250,000	250,000

Σ Values

Sum of Year 2 ▼
Sum of Year 1 ▼

The PivotTable now displays the columns for both years in the order listed in the Values area of the task pane.

Add and Then Remove a Labels Field

7. Place a checkmark by the **Sponsor Name** field in the top section of the PivotTable Field List task pane.
Notice the order of the fields in the Row Labels area. Now the sponsors and their contribution amounts are displayed within each sponsor category. Adding or deleting row labels allows you to control the level of detail displayed in a PivotTable.

Row Labels

Pledge Level ▼
Sponsor Cate... ▼
Sponsor Name ▼
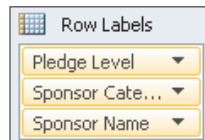
4	Row Labels	▼	Sum of Year 1	Sum of Year 2
5	⊟**Level 1**		**117,267,482**	**118,272,625**
6	⊟**Corporate Sponsorship**		**17,460,000**	**20,300,000**
7	Jensen Pharmaceutical		7,500,000	10,000,000
8	Medical Solutions Corp.		5,460,000	4,300,000
9	Open Systems		4,500,000	6,000,000
10	⊟**Federal Government Grant**		**49,899,591**	**47,894,948**
11	Admin for Children & Fam		5,129,874	8,075,333

8. Remove the checkmark by the **Sponsor Category** field and **Sponsor Name** field in the PivotTable Field List task pane.

9. Add a checkmark by the **Team Leader** field.
The team leader totals appear within each pledge level. Notice that some team leaders appear in multiple pledge levels. This view makes it easy to compare Year 1 and Year 2 data.

Pivot the View

10. Drag the **Team Leader** field from the Row Labels area to the Column Labels area below the Σ Values field.
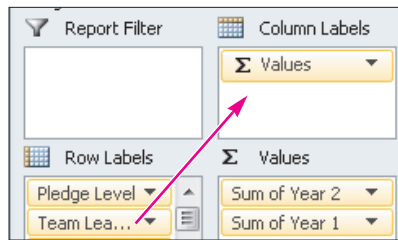
	Column Labels								Sum of Year 2
3									
4	Sum of Year 1								
5	Row Labels ▼ Abbott	Debowski	Faber	Lemus	Martinez	Nguyen	Park	Weinstein	Abbott
6	⊞Level 1		17,460,000	87,307,482				12,500,000	
7	⊞Level 2	750,000	250,000	2,000,000	754,063			2,500,000	
8	⊞Level 3	50,000	412,000	350,000	207,250			298,333	50,000
9	⊞Level 4	30,000	42,500	50,000	65,000			14,600	28,000
10	⊞Level 5	14,000	20,000		12,500	5,200	2,262	4,325	39,050
11	⊞Level 6	10,646				2,595	1,410	535	3,160
12	Grand Total	104,646	750,000	18,184,500	89,707,482	1,038,813	7,795	3,672	15,317,793	120,210

You just pivoted the team leader field to be displayed in columns rather than rows. This view allows you to compare each team leader's overall performance among the various pledge levels, but comparing Year 1 to Year 2 is more difficult than in the previous view.

11. Undo 🔙 the pivot you performed in the previous step.

12. Save 💾 the changes to your workbook.

Filtering a PivotTable with AutoFilter

Video Lesson   labyrinthelab.com/videos

You may set the PivotTable to filter, or include, specific items in the data summaries. The totals and subtotals are recalculated for the selected items. The Row Labels and Column Labels headings have an AutoFilter button that displays the same sorting and filtering options that are available on the columns of worksheet lists and tables.
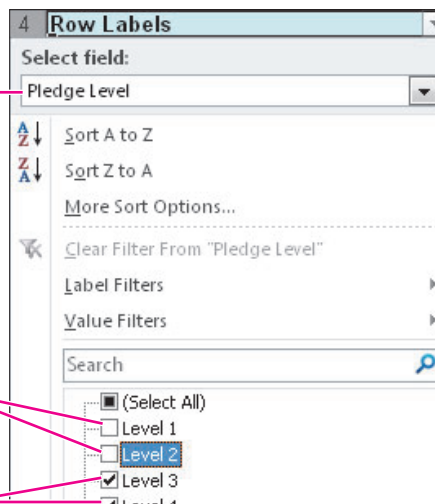
Filtering PivotTables with Slicers

New to Excel 2010, slicers are menu frames displayed on the worksheet that contain all filtering choices in one field. You can choose items or clear a filter without having to drop down a list. Selected items are highlighted in slicers, making it easy to see which criteria have been applied to the PivotTable filter. Slicer frames may be resized, moved, and formatted with styles for a consistent appearance. Slicers also may be shared in other worksheets of the same workbook for use with multiple PivotTables based on the same data set. Changing the filtering selections in a shared slicer causes all connected PivotTables to update automatically.

Highlighted items included in the current filter

Frame resizing handles

Clear Filter button

Dimmed item not available in the current filter (pledge level 1 contains no corporate grants)

Row Labels	Sum of Year 1	Sum of Year 2
Level 1	29,960,000	35,300,000
Faber	17,460,000	20,300,000
Weinstein	12,500,000	15,000,000
Grand Total	29,960,000	35,300,000

Pledge Level

Level 1
Level 2
Level 3
Level 4
Level 5
Level 6

Sponsor Category

Corporate Sponsorship
Federal Government Grant
Individual Sponsorship
State Government Grant
Corporate Grant
Individual Contribution
Local Business Contribution

Slicers allow you to filter a PivotTable easily by clicking buttons. Here, the PivotTable by Pledge Level is filtered to calculate each team leader's totals for corporate sponsorships and individual sponsorships in pledge level 1.

Items available but not selected in the current filter

QUICK REFERENCE	CHANGING PIVOTTABLE FIELD ORDER AND FILTERING A PIVOTTABLE USING AUTOFILTER AND SLICERS
Task	**Procedure**
Change the field order in rows or columns	■ Drag a field name above or below another field in an area list at the bottom of the PivotTable Field List task pane.
Remove a field	■ Uncheck the field name from the PivotTable Field List task pane.
Filter for specific items using AutoFilter	■ Click the AutoFilter ▼ button next to Row Labels, Column Labels, or a specific column label, if available, in the PivotTable.
	■ Choose a field from the fields available in the filtering list.
	■ Remove the checkmark form the desired item(s), or choose Label Filters, Value Filters, or Date Filters, depending on the type of data in the column.
Filter for specific items using slicers	■ Select any cell in the PivotTable.
	■ Choose Options→Sort & Filter→Insert Slicer 🔲 from the Ribbon. (Or, choose Design→Filter→Slicer.)
	■ Place a checkmark next to the desired fields in the Insert Slicers dialog box, and click OK.
	■ Choose one or more items in slicers, as desired. To select additional items in a slicer, hold down Ctrl while clicking each item. To remove items from a multiple selection, hold down Ctrl while clicking each item.

QUICK REFERENCE	CHANGING PIVOTTABLE FIELD ORDER AND FILTERING A PIVOTTABLE USING AUTOFILTER AND SLICERS
Task	**Procedure**
Clear a filter from a slicer	■ Choose the Clear Filter [icon] button in the upper-right corner of the desired slicer.
Move and resize a slicer	■ Point to a slicer's frame or title bar and drag to the desired location on the worksheet. ■ Drag a corner or side handle on the slicer frame to resize the slicer.
Display slicer buttons in multiple columns	■ Select the slicer. ■ Choose Options→Buttons→Columns [icon], and choose the number of columns from the Ribbon.
Apply a style to a slicer	■ Select the slicer. ■ Choose Options→Slicer Styles, and choose a style from the Ribbon.
Connect a slicer to additional PivotTables based on the same data set in the workbook	■ Select the slicer. ■ Choose Options→Slicer→PivotTable Connections [icon] from the Ribbon. ■ Place a checkmark by the PivotTable name(s) to which you wish to connect the slicer.

DEVELOP YOUR SKILLS 12.1.4

Filter a PivotTable with Slicers

In this exercise, you will display slicers on a PivotTable worksheet. You will move, resize, and format the slicers to fit around the PivotTable. Then, you will select items from the slicers to filter the PivotTable to look at the data in various ways.

Insert Slicers

1. Display the **PivotTable with Slicers** worksheet in the Sponsors workbook. (**Scroll** to the right in the worksheet tabs to locate the tab, if necessary.)
   The PivotTable displays the Sponsor Categories field as rows and the Sum of Year 1 and Sum of Year 2 fields as columns.

2. **Select** any cell in the PivotTable to display the PivotTable Tools in the Ribbon, if necessary.

3. Choose **Options→Sort & Filter→Insert Slicer** [icon] from the Ribbon.

4. Place a checkmark next to the **Pledge Level, Team Leader,** and **Sponsor Category** fields in the Insert Slicers dialog box; click **OK**.
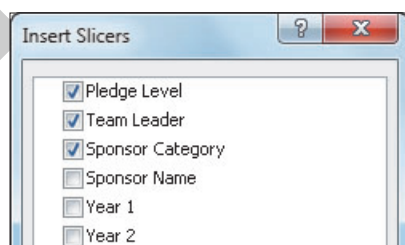
5. Select **cell A1** to hide the PivotTable Field List task pane, if still displayed.

Move and Resize Slicers

**6.** Follow these steps to move and resize the Sponsor Category slicer:

Ⓐ Point at the **Sponsor Category's** title bar until the pointer changes to a four-pointed arrow, and then **drag** the slicer to the right of the PivotTable.

Ⓑ Point at the **lower-right corner handle** on the slicer frame until the pointer changes to a two-pointed arrow, and **drag** to the right and down to display all the sponsor category names.
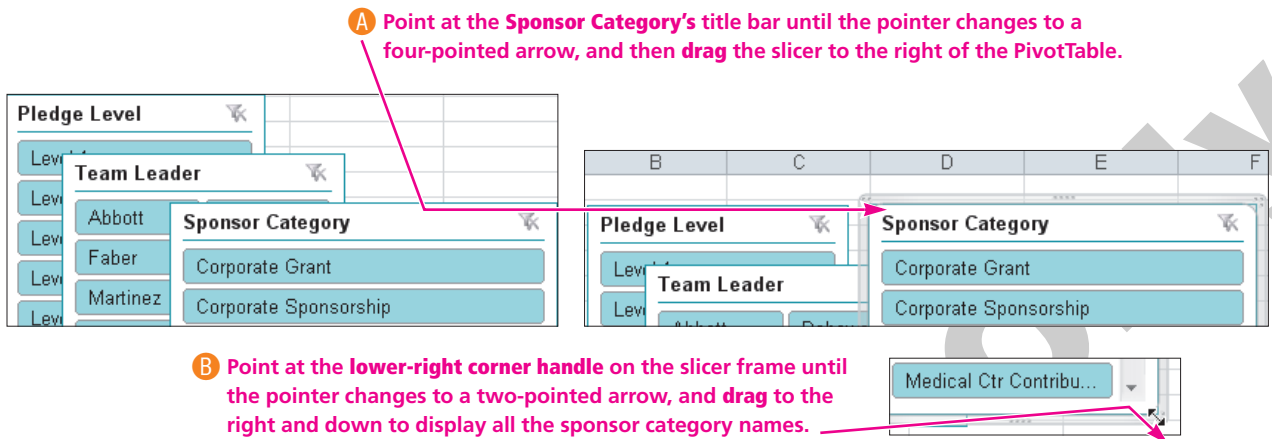
7. Drag the **Pledge Level** slicer and **Team Leader** slicer to **row 20** as shown.

8. Click the **Pledge Level** title to display the slicer's frame, and then **hold down** ⃞Shift and click on the **Team Leader** title.

Frames appear around the two slicers to indicate both are selected. If you click a slicer button by mistake, click the Clear Filter button in the upper-right corner of the slicer and repeat step 8.

9. Choose **Options→Buttons→Columns** from the Ribbon, and change the number of columns from 1 to **2**.
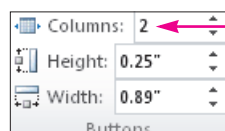
Apply Slicer Styles

10. Click the **Sponsor Category** title in the slicer at the right of the PivotTable, choose **Options→Slicer Styles**, and choose any style from the Ribbon.

11. Repeat **step 10** to apply styles of your choice to the **Pledge Level** slicer and **Team Leader** slicer.

Filter the PivotTable

12. Choose **Level 1** in the Pledge Level slicer.

The Team Leader slicer shows that Faber, Lemus, and Weinstein are included in the PivotTable totals. The buttons are dimmed for the other team leaders because they did not solicit any contributions at pledge level 1.

Four sponsor categories are displayed in the PivotTable, matching the four highlighted buttons in the Sponsor Category slicer. These are the only types of sponsors to contribute at level 1, the highest dollar level.

13. Click the **Clear Filter** button on the Pledge level slicer to restore all data in the Pivot-Table.

14. Select **Corporate Sponsorship** in the Sponsor Category slicer.
The Sum of Year 2 total in the PivotTable is 20,951,250. The slicers show that Pledge Levels 1–5 and team leader Faber are included.

15. Hold down Ctrl and select **Individual Sponsorship**.
The PivotTable and slicers reflect the additional category. You can use Ctrl+click to select additional items or deselect them in a slicer.

16. Experiment by **selecting** and **deselecting** various criteria in the slicers; **clear filters** from all slicers when you are finished.

17. **Save** the changes to the workbook.

Editing PivotTable Calculations

You are not limited to summing values in a PivotTable, and you may create additional formulas.

Changing the Function for a Values Area Item

By default, the subtotals and grand totals in a PivotTable sum the values in a field. You may use the Summarize Values By command to change the SUM function to a different function, such as AVERAGE, MAX, or COUNT. Not all Excel functions are available by using this command.

NOTE

If the Values area of the PivotTable Field List task pane contains only one entry, all Sum columns will change to the function you selected. If multiple entries exist in the Values area, you may change the function for one entry at a time.

Selecting a values column based on Sum of Year 1 and changing the function to AVERAGE changes all columns based on Sum of Year 1.

Σ Values

Sum of Year 1 ▼
Sum of Year 2 ▼

Σ Values

Average of Year 1 ▼
Sum of Year 2 ▼

Sum of Year 2 retains its SUM function unless the function is changed separately.

Creating a Calculated Field

Some functions not available with the Summarize Values By command described previously may be typed in the Insert Calculated Field dialog box. A calculated field is a column that you create manually in the PivotTable. This field contains a formula using values from one or more existing fields. For example, the formula could subtract the value in one field from another to find the difference, as shown in the following illustration. You enter the formula once, and Excel displays the formula result in every record of the PivotTable. For accuracy, you should select field names from the list rather than type their names in creating the formula for a calculated field.

Insert Calculated Field

Name: Difference   Add

Formula: = 'Year 2'- 'Year 1'   Delete

Fields:

Pledge Level
Team Leader
Sponsor Category
Sponsor Name
Year 1
Year 2
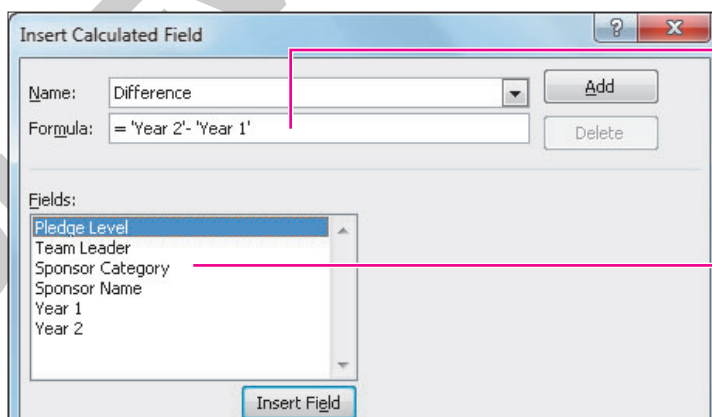
Insert Field

You may insert existing field names and/or type function names, values, and symbols to create a formula for a calculated field.

Field names may be selected from this list for insertion in the formula.

Converting Column Data to a Calculation

The Show Values As command creates formulas using preset options. For example, you can calculate percentages of a total, the difference between values in two columns, a running total, or a ranked order. If you want to display the original column data along with the converted data, simply drag and drop the field name from the field list to the Values area to create a duplicate field.

Refreshing PivotTable Data

PivotTables do not automatically update after the source data is changed.

PivotTables often are created with data from sources external to the Excel workbook containing the PivotTables. For example, the source data may be in another Excel workbook or an Access database. After you change the source data—even if in a worksheet range or table within the same workbook—you must refresh the PivotTables manually. Using the Ribbon, you may refresh just the active PivotTable or all PivotTables in the workbook. You also may set a PivotTable option to refresh data from external sources when the workbook is opened.

FROM THE KEYBOARD

Ctrl + Alt + F5 to refresh all data sources

QUICK REFERENCE	EDITING PIVOTTABLE CALCULATIONS AND REFRESHING DATA
Task	**Procedure**
Change the function used to calculate subtotals and grand total(s)	■ Select a number cell in any column of the PivotTable that contains the existing calculation. ■ Choose Options→Calculations-→Summarize Values By menu ▼, and choose a different function from the Ribbon. ■ If desired, repeat for any other calculation listed separately in the Values area of the PivotTable Field List task pane.
Create a calculated field to the right of existing PivotTable columns	■ Select any cell within the PivotTable. ■ Choose Options→Calculations→Fields, Items, & Sets menu ▼→Calculated Field from the Ribbon. ■ Type a name in the Name box of the Insert Calculated Field dialog box. ■ Edit the formula =0 to the desired formula by double-clicking field names and typing other parts of the formula, including math symbols (such as + or *).
Modify a formula in a calculated field	■ Choose Options→Calculations→Fields, Items, & Sets menu ▼→Calculated Field from the Ribbon. ■ Choose the calculated field name in the Name drop-down list (not the Field list) of the Insert Calculated Field dialog box. ■ Edit the formula and click Modify.

Creating PivotTables **475**

QUICK REFERENCE	EDITING PIVOTTABLE CALCULATIONS AND REFRESHING DATA (continued)
Task	**Procedure**
Delete a calculated field	■ Choose Options→Calculations→Fields, Items, & Sets menu ▾→Calculated Field from the Ribbon. ■ Choose the calculated field name in the Name drop-down list (not the Field list) of the Insert Calculated Field dialog box. ■ Click Delete.
Convert all data in a field to percentages of a total or calculate a difference, running total, or ranked order	■ If a duplicate field is desired to retain the original column data, drag and drop the field name from the upper part of the PivotTable Field List into the Values area. ■ Choose a number cell in the desired column of the PivotTable where you want to convert data. ■ Choose Options→Calculations→Show Values As menu ▾, and choose the desired preset option from the Ribbon to convert all data in the field.
Refresh PivotTables after changing source data	■ Choose Options→Data→Refresh menu ▾ from the Ribbon and choose one of the following: ◆ Refresh to update the active PivotTable. ◆ Refresh All (or use Ctrl + Alt + F5) to update all PivotTables in the workbook.

DEVELOP YOUR SKILLS 12.1.5

Change PivotTable Calculations

In this exercise, you will change the default SUM to a different function. You will create a calculated field to set a 110 percent contributions goal for each team leader. You also will change a value in the original source table and observe the effect upon PivotTables.

1. Display the **PivotTable by Pledge Level** worksheet.

Change a Function

2. Select a number cell in **column B** of the PivotTable. Then, choose **Options→Calculations→Summarize Values By menu ▾→Average** from the Ribbon.

The column heading changes to Average of Year 1 in the PivotTable and the Values area of the task pane. The subtotals and grand total now calculate averages. Notice that the Sum of Year 2 column did not change. You must edit the function separately for each calculation listed in the Values area of the task pane. You will leave Sum of Year 2 as is.

Create a Calculated Field

Assume that you set a goal for all team leaders to increase contributions by 110 percent in Year 3.

3. Choose **Options→Calculations→Fields, Items, & Sets menu ▾→Calculated Field** from the Ribbon.

4. Follow these steps to create a calculated field in the Insert Calculated Field dialog box:

Ⓐ Type **Goal 110% Year 2** in the **Name** box.

Ⓑ Tap Tab to highlight =0 in the Formula box. Type an **equals (=)** sign to begin the formula.

Ⓒ **Double-click** Year 2 and type *****110%** (make certain to type the asterisk) to finish the formula.

Insert Calculated Field

Name: Goal 110% Year 2

Formula: = 'Year 2'*110%

Fields:
Pledge Level
Team Leader
Sponsor Category
Sponsor Name
Year 1
Year 2
Goal 110% Year 2

Add
Delete
Insert Field

Ⓓ **Click Add.**   Ⓔ **Click OK.**

The calculated field displays as the last column of the PivotTable.

3	Row Labels ▾	Average of Year 1	Sum of Year 2	Sum of Goal 110% Year 2
4	⊟Level 1	13,029,720	118,272,625	130,099,888
5	Faber	5,820,000	20,300,000	22,330,000
6	Lemus	17,461,496	82,972,625	91,269,888
7	Weinstein	12,500,000	15,000,000	16,500,000

Change Worksheet Data

Cell C10 of the PivotTable shows that team leader Faber is responsible for $250,000 of Level 2 contributions in Year 2. Next, you will change a value in the table upon which the PivotTable is based.

5. Display the **Sponsors Table** worksheet. (Do not select the Sponsors Sheet tab.)

6. In **cell F98** for Year 2, change 250,000 to **200000**.

7. Display the **PivotTable by Pledge Level** worksheet.
Notice that Faber's level 2 amount in Year 2 still appears as 250,000 in cell C10. Changes to the source data do not *automatically update in the PivotTables.*

Refresh PivotTables

8. Choose **Options→Data→Refresh menu ▾→Refresh All** from the Ribbon.
Faber's amount now appears as 200,000, and the goal was recalculated in cell D10. Any other PivotTables or PivotCharts based on the same source data would also be updated.

9. Save 💾 the changes to your workbook.
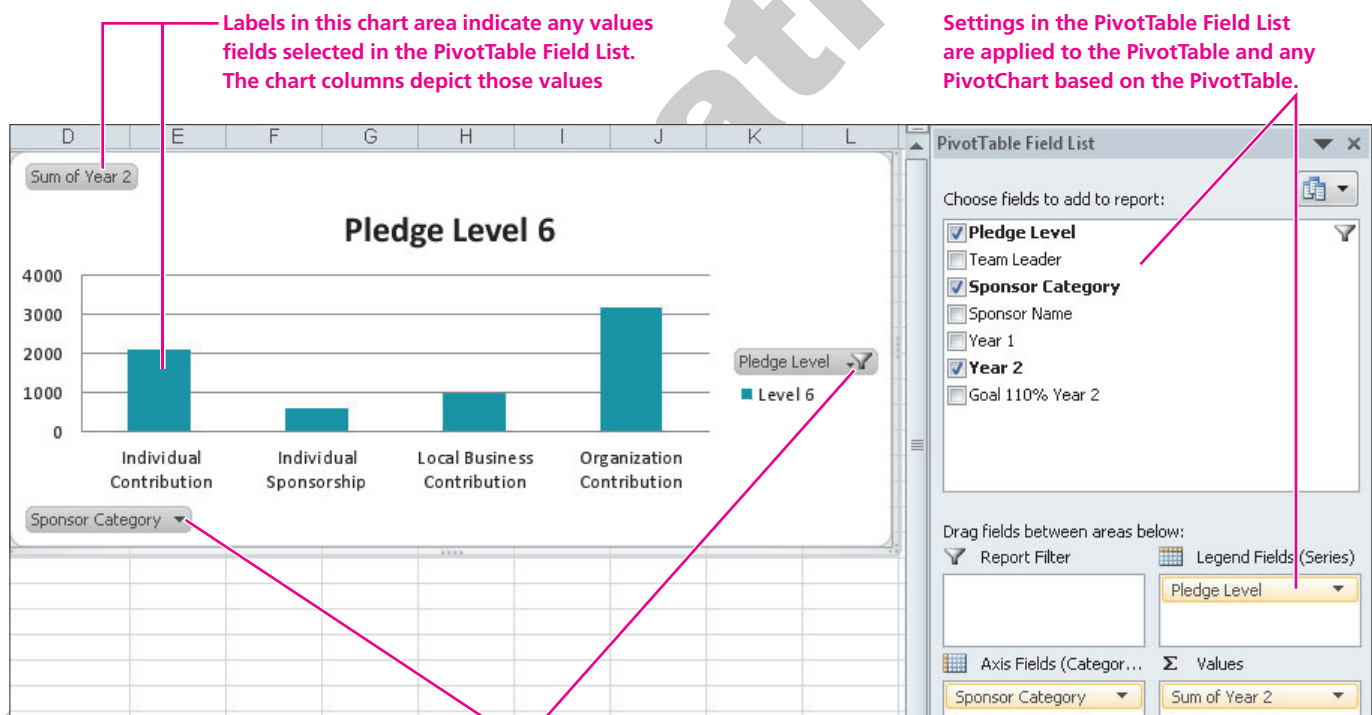
12.2 Creating PivotCharts

A PivotChart presents data from a PivotTable. There are two ways to create a PivotChart.

1. You may chart an existing PivotTable by choosing a chart type from the Insert ribbon as for a normal Excel chart.
2. You may use the PivotChart command to create a PivotTable and PivotChart from the source data at the same time. The chart builds as you choose fields in the PivotTable Field List task pane.

The field(s) in the values area of the PivotTable are displayed as data series in the chart. The row labels in the PivotTable are used as the axis labels in the chart, and the column labels are the data series in the chart legend.

Filtering PivotCharts

The PivotChart may be filtered using the AutoFilter buttons on the chart, AutoFilter buttons on the PivotTable, or slicers added to the worksheet. (See the previous filtering topics in this lesson.) The filtering is applied to the related PivotTable as well.

Labels in this chart area indicate any values fields selected in the PivotTable Field List. The chart columns depict those values

Settings in the PivotTable Field List are applied to the PivotTable and any PivotChart based on the PivotTable.

A PivotChart

The data may be filtered using the AutoFilter buttons. This chart is filtered to display only pledge level 6.

Copy a PivotTable before creating a PivotChart. Any changes to the chart update in the PivotTable copy. The design in the original PivotTable will be preserved for further analysis.

Formatting and Printing PivotCharts

You format PivotCharts using the same Ribbon commands as for normal Excel charts. You choose from the same variety of chart styles, including column, line, and pie. You format chart objects just as you would on a normal Excel chart. Some chart formatting, such as data labels, is not preserved after a PivotChart is refreshed. When a PivotChart is selected, the Print command will print only the chart. By first selecting a worksheet cell, you can print both the PivotTable and PivotChart as displayed on the worksheet.

QUICK REFERENCE	WORKING WITH PIVOTCHARTS
Task	**Procedure**
Create a PivotChart from an existing PivotTable	■ Select any cell within the PivotTable. ■ Choose Insert→Charts, and choose a chart type from the Ribbon. The chart is created next to the PivotTable.
Create a PivotTable and PivotChart concurrently from a worksheet range or table	■ Select any cell in the worksheet range or table. ■ Choose Insert→Tables→PivotTable menu ▼→PivotChart from the Ribbon. ■ Verify the worksheet range or table name in the Create PivotTable with PivotChart dialog box and click OK to place the PivotTable and PivotChart placeholders on a new worksheet. ■ Choose options for the PivotTable in the PivotTable Field List task pane. These options also create a column PivotChart automatically.
Modify PivotChart format	■ Select the chart and choose from the Design, Layout, and Format Ribbons as for a normal Excel chart.
Filter data in a PivotChart	■ Choose the AutoFilter button on the PivotChart for the desired field, and choose filtering options from the drop-down list. *or* ■ Choose Analyze→Data→Insert Slicer, choose the desired slicer(s), and click OK. ■ Choose the desired filtering criteria from the slicer(s).

Create a PivotChart

In this exercise, you will create a PivotChart from an existing PivotTable.

1. Display the **PivotChart** worksheet of the Sponsors workbook. (**Scroll** to the **right** in the worksheet tabs to locate the tab, if necessary.)

Create a PivotChart

2. **Select** any cell within the PivotTable and choose **Insert→Charts→Column**. Below 2-D Column in the chart types menu, choose **Clustered Column**. *A new column chart is created immediately from the settings in the PivotTable Field List.*

Notice that while the PivotChart is selected, the Column Labels area of the PivotTable Field list task pane is labeled Legend Fields (Series). The Row Labels area is labeled Axis Fields (Categories).

3. **Point** at the chart frame and **drag** the chart just below the PivotTable.

4. Place a checkmark next to **Year 2** in the PivotTable Field List.
The Sum of Year 2 column displays in the PivotTable, and the PivotChart displays an additional column for the Sum of Year 2 series.

Filter the PivotTable and PivotChart

Notice that the PivotTable has been filtered to display pledge Levels 4–6. The PivotChart matches this filtering. You will use the AutoFilter button on the chart to remove pledge level 4. You could also use the Row Labels AutoFilter button on the PivotTable.

5. Follow these steps to filter the PivotChart:

Ⓐ Choose the **Pledge Level AutoFilter** button at the lower-left corner of the PivotChart.

Ⓑ **Scroll** down the list.

Ⓒ Remove the checkmark next to **Level 4**.
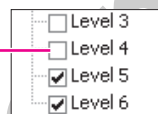
Ⓓ Click **OK**.

Format the PivotChart

6. **Select** the chart, if necessary.

7. Choose **Design→Type→Change Chart Type→Column→Clustered Cylinder** from the Ribbon and click **OK**.
The chart is reconfigured to the new chart type. You may use chart formatting commands on any PivotChart.

8. Choose **Layout→Labels→Chart Title→Centered Overlay Title** from the Ribbon, type **Levels 5 and 6** (your text appears in the Formula Bar), and **tap** Enter.

9. Feel free to add other formatting to the chart. For example, the values labels on the vertical axis could be formatted as Currency with no decimals, as shown here.
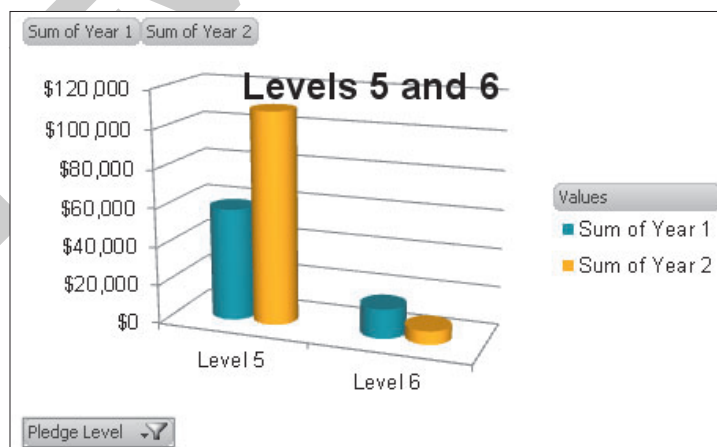
10. **Save** 🖫 the changes.

11. Use ⌨Ctrl⌨ + ⌨W⌨ or the **Close** button shown to close the workbook but leave Excel **open**.
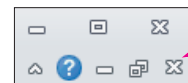
12.3 Changing Macro Security

A macro is a recorded set of mouse and keyboard actions that can be played back at any time. Macros are useful for automating routine tasks, especially if those tasks are lengthy. Though macros are a huge timesaver for your frequently used procedures, they also are a prime way to pass viruses to computers. Therefore, be cautious about opening workbooks containing macros that you receive from others.

Security Levels

You change macro security in the Trust Center section within Excel Options. Your setting there is in effect for all Excel workbooks that you open on your computer. The setting is not embedded in any workbooks that you save and share with others. You may choose among four different levels of security in Excel that control whether macros in an opened workbook are available or disabled:

- **Enable all macros**—You are not protected from potentially unsafe macros. This option is not recommended for general use.
- **Disable all macros except digitally signed macros**—This option automatically disables unsigned macros and enables macros from publishers you previously added to the trusted publishers list in the Trust Center. An invisible digital signature or visible signature line may be added to an Excel workbook.
- **Disable all macros with notification**—This is the default option, and it displays a message allowing you to enable macros in the specified workbook if you wish or use the workbook without enabling the macros.
- **Disable all macros without notification**—Only macros in workbooks that you placed in a trusted location of the Trust Center are allowed to run. All other digitally signed and unsigned macros are disabled.

If you have antivirus software installed, the file will be scanned for viruses before it is opened regardless of the security level you set.

⚠️ **NOTE**   Your network system administrator may set macro security and prevent users from changing it.

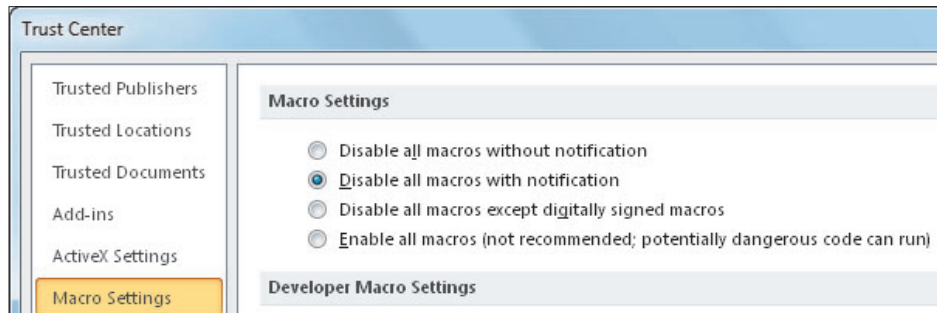| QUICK REFERENCE	CHANGING MACRO SECURITY
Task	**Procedure**
Change macro security	Choose File→Options 📄 →Trust Center→Trust Center Settings button→ Macro Settings, and choose a macro security option.

Changing Macro Security   **481**

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Verify Macro Security

In this exercise, you will verify the macro security setting on your computer. Then you will open a workbook and enable its macros.

1. Choose **File→Options** 📄 **→Trust Center**. Click the **Trust Center Settings** button and choose the **Macro Settings** category from the left side of the window. Choose **Disable All Macros with Notification** if not already selected.

```
Trust Center

Trusted Publishers          Macro Settings

Trusted Locations             ○ Disable all macros without notification
Trusted Documents             ● Disable all macros with notification
Add-ins                       ○ Disable all macros except digitally signed macros
                              ○ Enable all macros (not recommended; potentially dangerous code can run)
ActiveX Settings
                            Developer Macro Settings
Macro Settings
```

2. Choose the **Message Bar** category from the left side of the window. Verify that the following option is selected: **Show the Message Bar in All Applications When Content, Such As ActiveX and Macros, Has Been Blocked**.

3. Click **OK** twice to exit the Excel Options window.

4. **Open** the Macro Test workbook from the Lesson 12 folder in your file storage location.
   A Security Warning message displays below the Ribbon to alert you that macros are disabled. If you do not respond, the message will disappear after you begin working in the workbook.

```
⚠ Security Warning   Macros have been disabled.   [ Enable Content ]
```
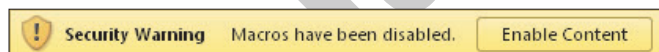
5. Click the **Enable Content** button next to the Security Warning.
   The macros are enabled.

6. Click the **Sort by Leader** button.
   The worksheet list should sort in order by team leader, indicating that the macro worked successfully.

7. **Close** the workbook without saving changes.

12.4 Recording Macros

Excel's macro recording feature saves your keystrokes and the commands you issue for a task. For example, you may record steps to choose page layout options and print a document by clicking the appropriate commands in the Ribbon. You then may play back a recorded macro at a later time. This is similar to using a video camera. You turn it on, press the record button, and stop recording when finished. You may replay the recording as many times as you want. Similarly, macros play back recorded keystrokes and mouse actions.

After the Record Macro button is clicked in the Status Bar, the Stop Recording button appears.

Naming a Macro

You should name your macros. If you do not, Excel names them Macro1, Macro2, and so on. Name your macros following the same rules that are used for defined names for ranges. Macro names may not contain spaces but may include capital letters or underscores to separate words. For example, you may name a macro FormatTitle or Format_Title.

Recording Macro Steps

Most actions you perform are recorded in the macro. These include mouse actions, choosing Ribbon commands, selecting options in dialog boxes, using cursor keys to navigate the worksheet, and typing text. Any mistakes and corrections you make during recording also are saved in the macro. You may decide not to rerecord the macro, however, if the final result is correct.

You should practice the procedure you wish to automate before you actually record the macro. This will help you avoid mistakes during the recording process.

Storing Macros

Macros are available only in the workbook in which you create them unless you assign them to the Personal Macro Workbook.

Current Workbook

Some macros are useful only in a particular workbook. For example, you may develop a macro to sort worksheet rows in a specific manner. The macro is useful only in the workbook in which it is created, so you would choose the storage option This Workbook.

Personal Macro Workbook

The Personal.xlsb file is a hidden file that makes its macros available in all open workbooks on your computer system. For example, you may create a macro to format headings with a consistent style to be used in various workbooks. You will assign a macro to the Personal Macro Workbook and delete macros from it in a Skill Builder exercise of this lesson.

Saving a Workbook Containing Macros

If you attempt to save a workbook containing macros using the normal Excel Workbook file format, Excel displays the message "The following features cannot be saved in macro-free workbooks: VB Project." Clicking No in the message box displays the Save As dialog box, where you should choose the Excel Macro-Enabled Workbook file format. The file is saved with the extension .xlsm in the file name to indicate that it contains a macro.

| File name: | Contributions with Macros |
| Save as type: | Excel Macro-Enabled Workbook |

QUICK REFERENCE	RECORDING A MACRO
Task	**Procedure**
Record a macro	■ Create the worksheet and prepare to record the macro.
	■ Click the Record Macro button on the Status Bar in the lower-left corner of the window.
	■ Right-click the Status Bar and choose Macro Recording in the context menu if the button does not display. Tap Esc to hide the context menu.)
	■ Type a descriptive name in the Macro Name box (spaces are not allowed) and fill in other options as desired.
	■ Click OK to begin recording.
	■ Execute the commands and actions you want the macro to record.
	■ Click the Stop Recording button on the Status Bar when you have finished recording.
Delete a macro	■ Choose View→Macros→View Macros (the top part of the button) from the Ribbon or use Alt + F8.
	■ Choose the desired macro name and click Delete.
Save a workbook containing macros	■ Choose Save and click No in the message box or choose Save As.
	■ Choose Excel Macro-Enabled Workbook from the Save as Type list in the Save As dialog box.

DEVELOP YOUR SKILLS 12.4.1

Record a Macro

In this exercise, you will record a macro to sort a table first by team leader and then by the contributions to date. You will save the workbook in the macro-enabled file format.
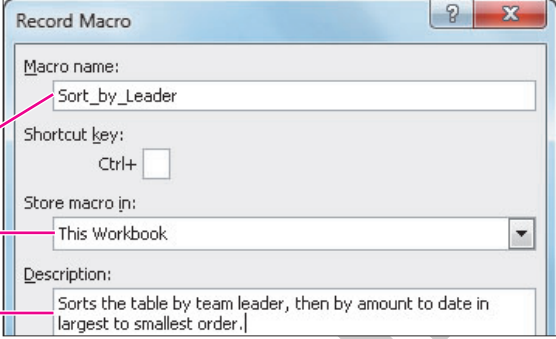
Before You Begin: Macro security should be set to Disable All Macros with Notification from Develop Your Skills 12.3.1.

Open the Workbook

1. **Open** the Contributions workbook.

   Take a moment to review the worksheet. Notice that it contains a table of sponsors and that each sponsor has been assigned to a team leader. Also notice that the list is sorted in order by sponsor name, and the table's AutoFilter column heading buttons are turned off. The goal of the next few exercises is to sort the table and add new sponsors to the table. You will record macros to automate the sorting process.

Record the Sort_by_Leader Macro

2. Click the **Record Macro** [icon] button on the Status Bar at the bottom-left corner of the window. (**Right-click** the Status Bar and choose **Macro Recording** in the context menu if the button does not display. **Tap** [Esc] to hide the context menu.)
The Record Macro dialog box appears.

3. Follow these steps to name the macro and begin the recording process:

Ⓐ **Taking care to type an underscore using** [Shift]+[-] **between the words, type** `Sort_by_Leader` **to name the macro. (Spaces are not allowed in macro names.)**

Ⓑ **Verify that This Workbook displays as the macro storage location.**

Ⓒ **Type the description shown.**

Record Macro

Macro name:
Sort_by_Leader

Shortcut key:
Ctrl+ [ ]

Store macro in:
This Workbook

Description:
Sorts the table by team leader, then by amount to date in largest to smallest order.

4. Click **OK**, and the macro will begin recording your actions.
If you make any mistakes, just correct the errors as you would normally. Major errors may be fixed either by stopping the recording and starting over or by editing the macro in the Visual Basic Editor (not covered in this lesson).

5. Select **cell B4** in the table.
This step ensures that the proper data is selected prior to sorting whenever the macro is run.

6. Choose **Data→Sort & Filter→Sort** from the Ribbon.
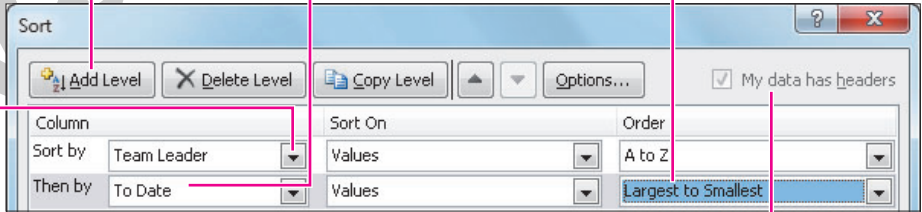
7. Follow these steps to set the Sort parameters and initiate the Sort:

Ⓐ **Click the drop-down button on the Sort By list and choose Team Leader.**

Ⓑ **Click the Add Level button.**

Ⓒ **Choose To Date from the list.**

Ⓓ **Choose Largest to Smallest from the list.**

Sort

[Add Level] [Delete Level] [Copy Level] [▲] [▼] [Options...] ☑ My data has headers

Column		Sort On		Order	
Sort by	Team Leader	Values		A to Z	
Then by	To Date	Values		Largest to Smallest	

Ⓔ **Verify that My Data Has Headers is on (the checkmark should already display).**

Ⓕ **Click OK.**

8. Click the **Stop Recording** [icon] button on the Status Bar at the bottom-left corner of the window.

Your actions have been saved in the macro. The list is sorted as shown in the following illustration. Keep in mind that the macro recorded this sort sequence.

	A	B	C	D	E	F	G
3	Pledge	Team Leader	Sponsor Category	Sponsor Name	Year 1	Year 2	To Date
4	Level 5	Abbott	Organization Contribution	Accountancy Association	0	15,000	15,000
5	Level 4	Faber	Corporate Sponsorship	Accurate Biomedical	10,000	10,000	20,000
6	Level 1	Lemus	Federal Government Grant	Admin for Children & Fam	5,129,874	8,075,333	13,205,207
7	Level 3	Faber	Corporate Sponsorship	Alpha Supplies Corp.	125,000	50,000	175,000
8	Level 6	Nguyen	Individual Contribution	Andres Padilla	0	500	500
9	Level 5	Weinstein	Individual Sponsorship	Anonymous	500	500	1,000
10	Level 6	Weinstein	Individual Sponsorship	Anonymous	300	200	500
11	Level 6	Weinstein	Individual Sponsorship	Anonymous	235	145	380
12	Level 6	Weinstein	Individual Sponsorship	Anonymous	0	250	250
13	Level 4	Faber	Corporate Sponsorship	Aspen Medical Services	20,000	0	20,000
14	Level 6	Park	Local Business Contribution	Breeze Auto Sales	560	622	1,182
15	Level 2	Lemus	Private Grant	BTP Foundation	50,000	950,000	1,000,000
16	Level 5	Abbott	Organization Contribution	Business Roundtable	0	15,000	15,000

Save the Workbook as Macro-Enabled

9. Click **Save** 💾.

A message displays as shown. The VB Project indicated is a Visual Basic Project module containing your macro.
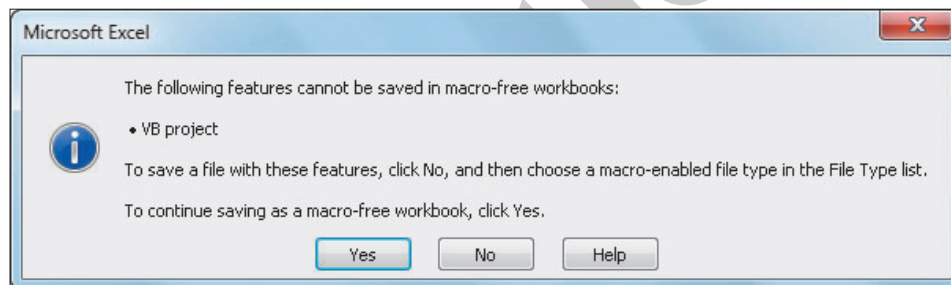
10. Click **No** to display the Save As dialog box.

11. Edit the **File Name** to **Contributions with Macros**.

12. Drop down the Save As type list, choose **Excel Macro-Enabled Workbook**, and click **Save**.
The macro is saved as part of the workbook named Contributions with Macros.xlsm. If you were to close the workbook, the macro would be available the next time you opened the workbook. The Disable All Macros with Notification security setting is in effect, so you still can control whether macros actually are enabled in an opened workbook.
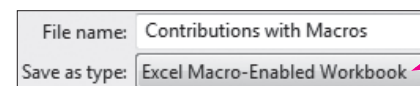
12.5 Running Macros

You may run macros in a variety of ways. The method you use depends on how the macro was assigned. You may create a macro and assign it to a shortcut key, graphic, or Quick Access toolbar button. An unassigned macro must be run by using the Macros command on the Ribbon and selecting a macro. This procedure may be used to run any macro recorded in the current workbook, even if the macro was assigned. The keyboard shortcut Alt + F8 may be used to display the Macro dialog box.

FROM THE KEYBOARD
Alt + F8 to view macros

QUICK REFERENCE	RUNNING A MACRO
Task	**Procedure**
Run an unassigned or assigned macro from the Ribbon	■ Choose View→Macros→View Macros from the Ribbon or use Alt + F8. ■ Choose the desired macro name and click Run.
Run an assigned macro	■ Use the shortcut key or click the assigned graphic, worksheet button, or Quick Access toolbar button.

DEVELOP YOUR SKILLS 12.5.1
Run an Unassigned Macro

In this exercise, you will sort the contributions table manually in a different order and then run the Sort_by_Leader macro.

Before You Begin: You must have completed Develop Your Skills 12.4.1, and the Contributions with Macros workbook should be open. Macro security should be set to Disable All Macros with Notification from Develop Your Skills 12.3.1. If you reopened the Contributions with Macros workbook and the Security Warning message appears under the Ribbon, choose Enable Macros.

1. Select **cell D4** and choose **Data→Sort & Filter→Sort A to Z** from the Ribbon.
   The contributions table is sorted alphabetically by sponsor name. Now you will run the macro you created in the previous exercise.

2. Choose **View→Macros→View Macros** from the Ribbon.

3. Choose the **Sort_by_Leader** macro and click **Run** in the Macro dialog box.
   The list is sorted by team leader, then by the To Date amount in highest to lowest order within each team leader's rows. The macro saves you time because you did not need to choose the Sort command and set options manually.

4. **Save** the changes to the workbook.

12.6 Assigning Macros

You may run a macro from within the Macro dialog box. However, macros are more accessible if you assign them to shortcut keys, custom buttons or graphics on a worksheet, or buttons on the Quick Access toolbar. You then run the macro by issuing the shortcut key or clicking the object to which the macro is assigned.

Assigning Macros to Shortcut Keys

Excel lets you assign a macro to a shortcut key as you name the macro. You may run the macro simply by using the shortcut key combination. You must use [Ctrl] or [Ctrl]+[Shift] as part of the shortcut key combination. Any shortcut you assign will override an existing Excel command shortcut. For example, you may assign [Ctrl]+[B] to a macro, but that combination would no longer choose Bold from the Ribbon.

> **TIP**
> If you are in the habit of using Microsoft's command shortcuts, use [Ctrl]+[Shift] for your macro shortcuts.

DEVELOP YOUR SKILLS 12.6.1

Assign a Macro to a Shortcut Key

In this exercise, you will create a macro to add a new sponsor to the table and assign the macro to a shortcut key. You will run the macro to add a sponsor. Then you will assign a shortcut key to the macro you created in the previous exercise and use its shortcut key to sort the list.

Before You Begin: You must have completed Develop Your Skills 12.4.1 and 12.5.1, and the Contributions with Macros workbook should be open. Macro security should be set to Disable All Macros with Notification from Develop Your Skills 12.3.1. If you reopened the Contributions with Macros workbook and the Security Warning message now appears under the Ribbon, choose Enable Macros.

Assign a Shortcut Key and Record the Insert_Student Macro

You will record a new macro that automates the process of inserting a new sponsor record just below the table header row.

1. Click the **Record Macro** 📇 button on the Status Bar.
   The Record Macro dialog box appears.

2. Follow these steps to name a new macro:

Ⓐ **Type Insert_Sponsor in the Macro Name box.**

Ⓑ **Tap [Tab] to move to the Shortcut Key text box. Hold down [Shift] and tap [I] to set the shortcut as Ctrl+Shift+I.**

Ⓒ **Verify that the macro will be stored in This Workbook.**

Ⓓ **Leave the Description box empty. A description is optional.**

Ⓔ **Click OK.**

Record Macro

Macro name:
Insert_Sponsor

Shortcut key:
Ctrl+Shift+ I

Store macro in:
This Workbook

Description:

In the next few steps, you will perform the actions to be recorded in the macro. You will insert a blank table row below the column headings and copy cell formatting to the blank cells.

3. Select **cell A4**.

4. Taking care not to select the menu ▼ button, choose **Home→Insert** from the Ribbon.
A blank row is inserted at row 4, and its cells are formatted like the column headings.

5. Select the **range A5:G5**, and choose **Home→Clipboard→Format Painter** 🖌 from the Ribbon.

6. Select **cell A4** to apply the cell formatting from row 5 to the blank row 4.

7. Select **cell A4** again to position the pointer for data entry.

8. Click the **Stop Recording** 🔳 button on the status bar.

Run the Macro to Add New Students

9. Delete the blank **row 4** that you inserted while creating the macro.

10. Use Ctrl + Shift + I to run the Insert_Sponsor macro. (Hold down Ctrl, then also hold down Shift, and then tap I. Release Ctrl and Shift.)
The pointer moves to cell A4 and blank cells are inserted. New sponsors always will be added to a new row below the header row.

If your macro did not work correctly, choose View→Macros→Macros→Insert_Sponsor, and then click Delete. Then repeat steps 1–10, choosing Yes when asked if you wish to replace the macro.

11. Add the following sponsor to the table. **Tap** Tab after entering the Year 2 value, and the To Date total will be calculated automatically.

4	Level 6	Weinstein	Individual Contribution	Raul T. Garcia	0	500	500

12. Run the Insert_Sponsor macro again and add this sponsor to the table:

4	Level 6	Weinstein	Individual Contribution	Wayne Zobe	0	300	300

Assign a Shortcut Key to the Sort_by_Instructor Macro

13. Choose **View→Macros→View Macros** 🔲 from the Ribbon.

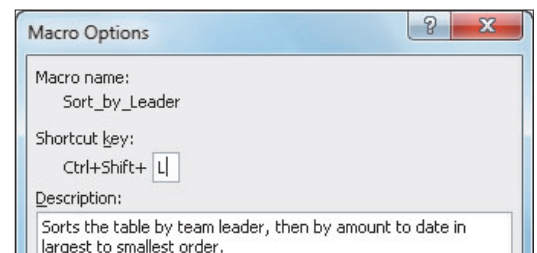**14.** Choose the **Sort_by_Leader** macro and click **Options** in the Macro dialog box.

15. In the Shortcut Key text box, **press** Shift, and **tap** L to set the shortcut key to Ctrl+Shift+L. Click **OK**.

16. Click **Cancel** to exit the Macro dialog box.

17. Use Ctrl + Shift + L to run the macro.
The table is sorted by team leader and then by To Date amount in highest to lowest order within each team leader group. The Raul T. Garcia record moves to row 98 in the Weinstein team leader group. The Wayne Zobe record moves to row 101.

18. Save 💾 the changes to the workbook.

Macro Options

Macro name:
    Sort_by_Leader

Shortcut key:
    Ctrl+Shift+ L

Description:
Sorts the table by team leader, then by amount to date in largest to smallest order.

Assigning Macros to Custom Buttons

A macro assigned to a custom button is run whenever the button is clicked. The easiest way to create a custom button is to add a shape, such as a rectangle, to the worksheet. You then assign a macro to the button. You may position custom buttons anywhere in a worksheet. To avoid deleting buttons in error, do not place them in rows or columns that could be deleted in the future. A custom button may also contain a descriptive label to help identify its function or the macro that is assigned to it.

> **TIP**
>
> You may create custom buttons using the Button (Form Control) tool on the Developer tab. To display this tab, choose File→Options from the Ribbon, select Customize Ribbon at the left of the Excel Options dialog box, and place a checkmark next to Developer in the Main Tabs list at the right. The Developer tab contains commands for working with macros.

| QUICK REFERENCE	ASSIGNING A MACRO
Task	**Procedure**
Assign a macro to a shortcut key as the macro is created	■ Click the Record Macro button on the Status Bar. ■ While filling in options in the Macro dialog box, click in the Shortcut Key text box and key a single letter, or hold Shift and key the letter.
Assign a macro to a shortcut key after the macro is created	■ Choose View→Macros→View Macros from the Ribbon. ■ Choose the macro name and click Options in the Macro dialog box. ■ In the Macro Options dialog box, click in the Shortcut Key text box and key a single letter, or hold Shift and key the letter.
Assign a macro to a custom button or graphic on the worksheet	■ Record the macro. ■ Insert a shape, picture, or clip art image on the worksheet. Right-click the object and choose Assign Macro from the context menu. Choose the desired macro from the Assign Macro dialog box. ■ To display a text label in a shape used as a custom button, select the button in the worksheet and type the desired text in the button. ■ If necessary, resize the button or graphic, drag it to the desired worksheet location, and align multiple buttons.

DEVELOP YOUR SKILLS 12.6.2
Assign Macros to Custom Buttons

In this exercise, you will create buttons and assign the Insert_Sponsor and Sort_by_Leader macros to them.

Before You Begin: Macro security should be set to Disable All Macros with Notification from Develop Your Skills 12.3.1. If you reopened the Contributions with Macros workbook and the Security Warning message appears under the Ribbon, choose Enable Macros.

Create Buttons

1. Choose **Insert→Illustrations→Shapes→Rectangles→Rectangle** 🔲 shape tool from the Ribbon.

2. Drag the mouse to draw a button on **cell D1**.

3. Copy and paste the button to cell **E1**.
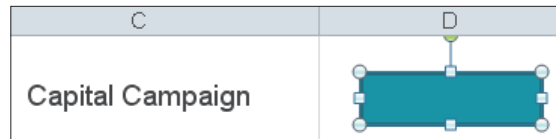
Name Buttons

**4.** Select the **first button** and type **Insert Sponsor**; do *not* tap Enter.

5. Select the **second button** and type **Sort by Leader**.
Button text may contain spaces because it is only a label.

6. **Click** outside the button to deselect it.

7. If necessary, **align** the buttons: Select the first button, use Shift + click to select the second button, and choose **Format→Arrange→Align→ Align Top** from the Ribbon.

Formatting the buttons is easier if completed before you assign macros to the buttons. If you wish, you may change the colors and outline in custom buttons.
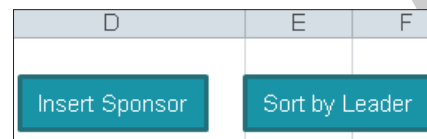
Assign Macros to Buttons

8. **Deselect** the two buttons.

9. **Right-click** the Insert Sponsor button and choose **Assign Macro** from the context menu.

10. In the Assign Macro dialog box, choose **Insert_Sponsor** from the list and click **OK**.

11. Use the preceding steps to assign the **Sort_by_Leader** macro to its button.

Run Macros Using the Buttons

12. **Deselect** the button.

13. Click the **Insert Sponsor** button to run the Insert_Sponsor macro. (Deselect the button and select again if the pointer does not display as a hand as you select the button.)
A new row appears just below the header row.

14. Add this sponsor to the new row:

| 4 | Level 3 | Abbott | Organization Contribution | Kelsey Foundation | 0 | 50,000 | 50,000 |

15. Click the **Sort by Leader** button to run the Sort_by_Leader macro.
The new row is sorted into the worksheet as row 5.

16. **Save** 💾 the changes and **close** the workbook.
Now you have learned to create simple macros to automate routine tasks. You ran macros using the Ribbon, shortcut keys, and custom buttons on the worksheet.

12.7 Concepts Review

Concepts Review   labyrinthelab.com/excel10

To check your knowledge of the key concepts introduced in this lesson, complete the Concepts Review quiz by going to the URL listed above. If your classroom is using Labyrinth eLab, you may complete the Concepts Review quiz from within your eLab course.

Reinforce Your Skills

Create a PivotTable and a PivotChart

In this exercise, you will create a PivotTable and PivotChart simultaneously from a worksheet table. You will practice placing and pivoting fields to change your view of the data.

1. **Start** Excel and **open** the rs-Jan Sales PivotTable workbook from the Lesson 12 folder.
   The January Sales worksheet displays one month's activity at Avery Internet Auto Sales. Before you create a PivotTable, take a moment to look over the layout of the data fields and records. For example, notice that there is just one field for numeric data in this table.

Create the PivotTable and PivotChart

2. Select **cell A4**.
   This tells Excel to use the table data when you create the PivotTable.

3. Choose **Insert→Tables→PivotTable** 🔲 **menu ▾→PivotChart** from the Ribbon, verify **JanSales** as the table data to be used, and click **OK** to create a PivotTable and PivotChart in a new worksheet.

4. **Rename** the Sheet1 sheet tab to **PivotTable**.
   The PivotTable Field List task pane is displayed. If it does not and you made certain the chart is selected, choose Analyze→Show/Hide→Field List. You may turn on/off the pane as needed.

5. In the PivotTable Field List task pane, place a checkmark in the **Sold By** and **Price** checkboxes.
   The PivotTable displays the total sales for each salesperson using the Sum of Price field in the values area of the PivotTable Field List task pane. The chart is selected, so the task pane displays Axis Fields (Categories) and Legend Field areas.

6. **Select** a cell in the PivotTable, and the same areas now are titled Row Labels and Column Labels to reflect those items in the PivotTable.

Add a Field

Since you may need to know which types of cars each salesperson sold during January, you will place a new field in the row field's area.

7. Place a checkmark in the **Type** box on the task pane to add the field to the Row Labels area.

	A	B
1	Row Labels ▾	Sum of Price
2	⊟ Jones	**190470**
3	Coupe	37950
4	SUV	152520
5	⊟ Lehman	**142620**
6	Sedan	65445
7	SUV	54675
8	Truck	22500
9	⊟ Palmas	**146675**
10	Sedan	98425
11	Truck	48250
12	**Grand Total**	**479765**

▦ Row Labels	Σ Values
Sold By ▾	Sum of Price ▾
Type ▾	
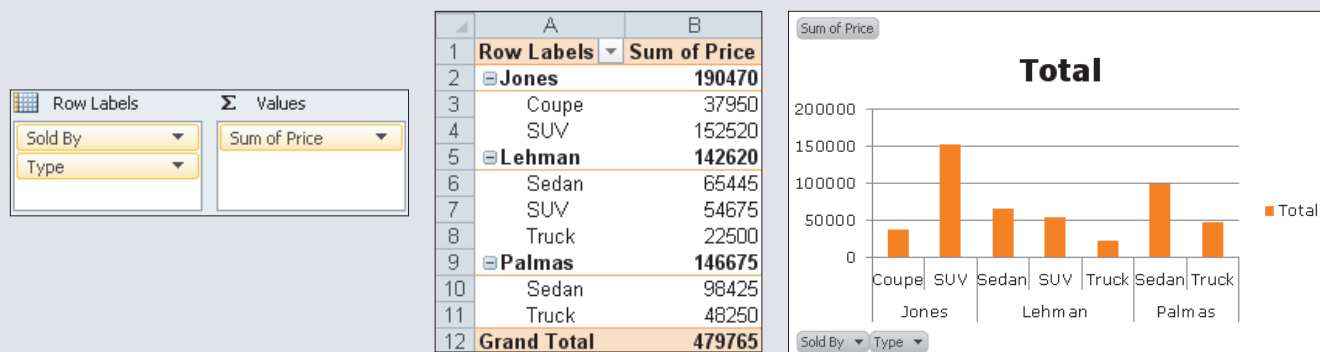
The PivotTable and PivotChart expand to display the sales of the various types of vehicles sold by each salesperson. It might also be interesting to summarize how the revenue at the dealership breaks down by vehicle type, so in the next step you will pivot the Type field from the row area to the column area.

Arrange Items in the Window

You may not see the entire PivotTable and PivotChart as items change in the window.

8. Follow these steps to maximize space:

Ⓐ **Undock** the task pane by dragging its title bar down and to the left. The task pane now is smaller, and you may move it at any time.
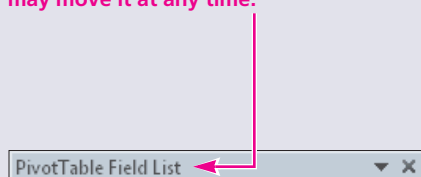
Ⓑ **Resize** the PivotTable Field List by dragging its bottom border up or down to keep desired options visible.
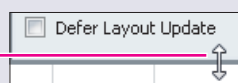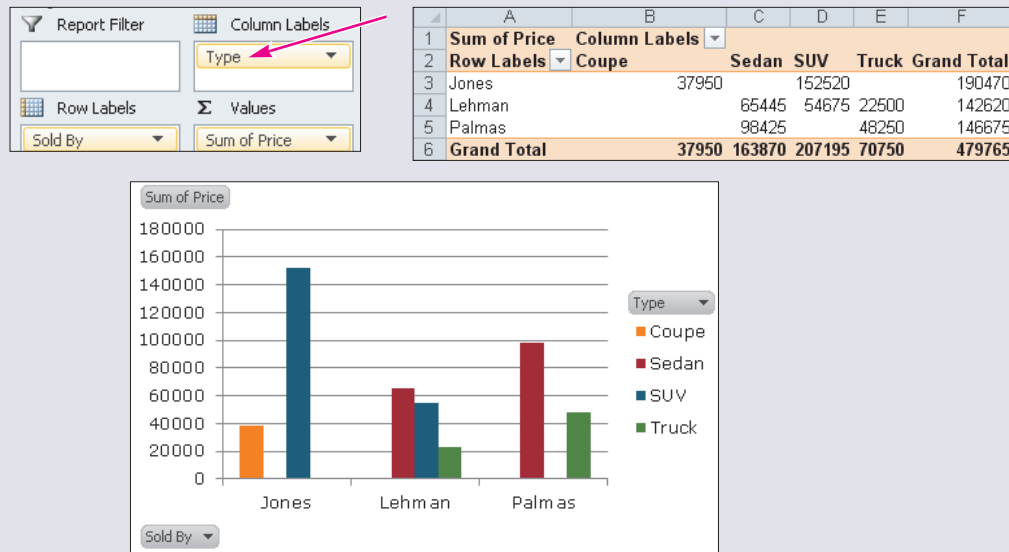
Ⓒ To prevent the PivotChart from covering the PivotTable in the next step, **move** the PivotChart to the right by dragging the chart frame. until the left edge of the chart is in column G.
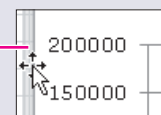
Pivot the View

9. Drag the **Type** field to the Column Labels area.

The Grand Total line at the bottom of the PivotTable displays the revenue for each type of car. The chart displays columns for each car type.

Add a Field and Pivot the View

10. Place a checkmark in the **New/Preowned** box on the task pane to add the field to the Row Labels area and observe the effect in the PivotTable and the PivotChart.

11. Drag the **New/Preowned** field above Sold By in the Row Labels area of the task pane as shown.
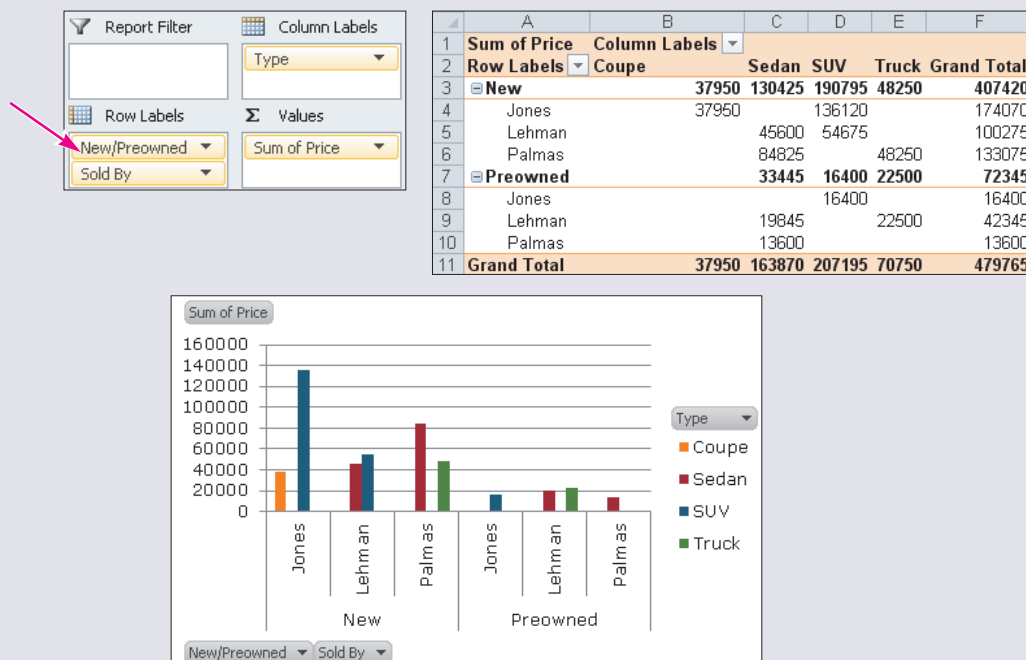
This view clearly shows that revenue is much greater for new cars than preowned, as might be expected.

12. Move the PivotChart to below the PivotTable so both fit on **one printed page**.

13. Drag the PivotTable Field List task pane to the right edge of the screen, until the task pane is docked.

14. Select a cell in the PivotTable to deselect the PivotChart.
Only the chart would print when the chart is selected.

15. Save 🖫 the changes and **close** the workbook.
As you have seen, PivotTables and PivotCharts help you display and analyze data in various ways with a minimum of setup steps.

<div style="background:#5ab0d6;color:white;padding:4px 10px;display:inline-block;font-weight:bold">REINFORCE YOUR SKILLS 12.2</div>

Filter a PivotTable

In this exercise, you will filter to exclude data items from a PivotTable. You also will use a slicer to filter by a field not displayed in the PivotTable.

1. Open the rs-Feb Sales PivotTable workbook.
Look at the table data in the February Sales worksheet. A PivotTable and a PivotChart were created using this data.

2. Display the **PivotTable** worksheet.
You will not use the field buttons in the PivotChart, so they were turned off in the Analyze ribbon.

3. Select a cell within the PivotTable to display the PivotTable Field List task pane, if necessary.

Use AutoFilter

4. Follow these steps in the PivotTable to suppress the display of data for Walk-In sales:

A Click the **Row Labels AutoFilter** button in **cell A3**.

B Remove the checkmark from the **Walk-In** box.

C Click **OK**.
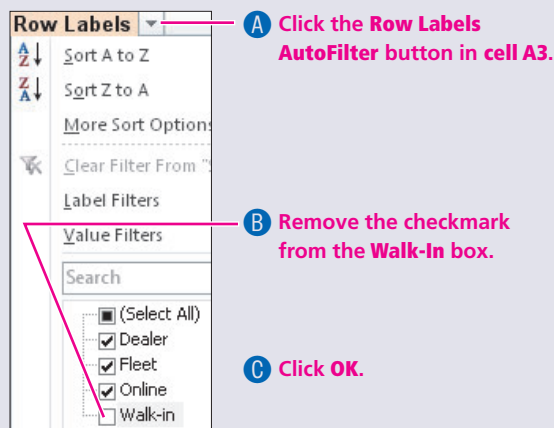
Notice that no data is displayed for Walk-In sales, and the Row Headers filter button displays a filter icon. You may use this method to switch the display of individual data items on and off for any field in the Row Labels or Column Labels.

5. Display the **Row Labels** filter list again and choose **Clear Filter from "Source."**

Delete and Add Fields in the PivotTable

6. In the PivotTable Field List task pane, remove the checkmark from the **Source** box.

7. Place a checkmark in the **Financing** box to add the field to the PivotTable.
The pie chart displays bank/credit union financing as 46 percent, dealer financing as 42 percent, and cash as 12 percent for all vehicles sold.

Filter with a Slicer

Notice that the New/Preowned field does not have a checkmark in the PivotTable Field List, so the field does not appear in the PivotTable. At times, you may wish to maintain a simplified PivotTable and PivotChart design. You can use slicers to filter for fields that are not displayed. Next, you will filter for new and preowned vehicles.

8. Choose **Insert→Filter→Slicer** from the Ribbon.

9. In the Insert Slicers dialog box, place a checkmark next to **New/Preowned**, and click **OK**.
The New/Preowned slicer displays on the worksheet window, and the PivotTable Filter List task pane is hidden.

10. Point to the **New/Preowned** title in the slicer, and **drag** the slicer frame so it is not covering the PivotTable or PivotChart.

11. Choose **New** in the slicer.
The Sum of Price column in the PivotTable and the PivotChart percentages have changed to include only new vehicles. The pie chart displays Dealer financing as 46 percent but Cash financing as only 6 percent of new vehicles sold.

12. Choose **Preowned** in the slicer.
The values and percentages update to include only preowned vehicles. Now you can see that dealer financing is only 21 percent and the majority of preowned vehicle purchases were paid in cash.

13. **Select** the PivotChart, choose **Design→Chart Styles→More**, and choose a **chart style** that displays good contrast between the colors of the text and pie slices.

14. Change the **page orientation** or **resize** the chart, if necessary, to fit the PivotTable and PivotChart on one printed page.

15. **Save** the changes and **close** the workbook.

REINFORCE YOUR SKILLS 12.3

Create a Macro for the Personal Macro Workbook

In this exercise, you will create a macro that selects an entire worksheet, formats all cells with bold, and widens the columns. You will assign the macro to the personal macro workbook to make it available for use in other workbooks you may open.

Begin Recording the Macro

1. **Start** a new workbook.

2. Click the **Record Macro button** on the Status Bar.

3. **Type** the macro name **FormatSheet** in the Record Macro dialog box.

4. Set the Store Macro In option to **Personal Macro Workbook**.

Choose This Workbook instead if you cannot save a macro to the Personal Macro Workbook on your computer system.

5. Click **OK** (and replace the macro if it already exists) to begin the recording process.

Set Worksheet Formats

6. Use Ctrl + A to select the entire worksheet.

7. Use Ctrl + B to bold all cells.

8. Choose **Home→Cells→Format** →**Column Width** to display the Column Width dialog box, type **12**, and **tap** Enter to choose **OK**.

9. Select **cell A1** to deselect the highlighted cells.

10. Click the **Stop Recording** button on the Run the Macro status bar.

11. Choose **File→Close** and choose **not** to save when Excel asks if you want to save the workbook.

Run the Macro

12. Start a new workbook and choose **View→Macros→View Macros** (the top part of the button) to display the Macro dialog box.
    Any macro with PERSONAL.XLSB! in its name has been saved to the Personal Macro Workbook and is available to all open workbooks.

13. Choose the **PERSONAL.XLSB!FormatSheet** macro and click the **Run** button. (Choose FormatSheet rather than PERSONAL.XLSB!FormatSheet if you saved the macro to This Worksheet.)
    The column and text formats are set. Keep in mind that you may apply virtually any formatting to cells, columns, rows, text, or numbers with a macro.

## Delete the Macro from the Personal Macro Workbook

Macros stored in the Personal Macro Workbook cannot be removed with the Delete button in the Macro dialog box. Just read the next steps and complete step 20 if you saved the macro to This Workbook rather than Personal Macro Workbook.

14. Choose **View→Macros→View Macros** from the Ribbon.

15. Follow these steps to delete the FormatSheet macro from the Personal Macro Workbook:

Ⓐ **If you don't see the macro name, change the Macros In setting to All Open Workbooks.**

Ⓑ **Click the PERSONAL.XLSB!FormatSheet macro from the list box (not from the first box under Macro Name).**
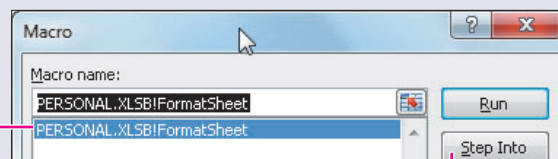
Ⓒ **Click the Step Into button.**

The macro code displays in the Microsoft Visual Basic for Applications window.

16. In the Microsoft Visual Basic for Applications window, choose **Tools→Macros**.

17. In the Macros dialog box, set the Macros In option to **VBA Project (PERSONAL.XLSB)**.

18. Choose the **FormatSheet** macro, click **Delete**, and click **OK** to confirm.

19. **Close** the Microsoft Visual Basic for Applications window to reveal the Excel workbook window.

In this exercise, you deleted the macro to keep the computer system "clean." Normally, you would leave macros stored in the personal macro workbook so they could be used in all workbooks.

20. **Close** the empty workbook without saving it.

Apply Your Skills

Create a PivotTable

In this exercise, you will create a PivotTable to calculate the cost of care and shelter for healthy and sick animals at Capital City Animal Shelter.

1. **Open** the as-April Expenses workbook from the Lesson 12 folder.

2. Examine the April Expense Report worksheet. Identify the fields you will use in the PivotTable.

Create the PivotTable

3. Create a **PivotTable** on a new worksheet.

4. **Rename** the new sheet with a descriptive name of your choice.

5. **Rename** the PivotTable as **April Expenses**.

6. Set up fields for the PivotTable so that the rows summarize the data by **cats/dogs** and then by **age**.

7. Set up fields so that the columns compare the cost of caring for **healthy** and **sick** animals.

8. Set up fields to total the cost of **care** and **shelter**.

Format the PivotTable

9. **Apply** a PivotTable style.

10. Format all numbers with **Comma Style and two decimal places**.
    When you finish, your PivotTable should match the following figure, except for field labels.

Your PivotTable displays some additional labels. They were removed from this figure because they would display a significant part of the exercise solution.

	A	B	C	D
3	Sum of Total Costs	Column Labels ▼		
4	Row Labels ▼	Healthy	Sick	Grand Total
5	⊟Cat	349.75	292.25	642.00
6	Adult	349.75	182.50	532.25
7	Kitten		109.75	109.75
8	⊟Dog	919.50	448.00	1,367.50
9	Adult	564.00	67.00	631.00
10	Pup	355.50	381.00	736.50
11	Grand Total	1,269.25	740.25	2,009.50

Change Worksheet Data and Update the PivotTable

11. In the April Expenses worksheet, change the cost per day in **cell F1** to **$5.25**.

12. Do whatever is necessary to **update** the PivotTable to reflect the change you just made.

13. **Save** 🖫 the changes and **close** the workbook.

APPLY YOUR SKILLS 12.2

Create a PivotTable and PivotChart

In this exercise, you will create a PivotTable and PivotChart that display the cost of care and shelter for sick and healthy animals summarized by animal type and health. The chart will be a stacked column chart.

1. **Open** the as-May Expenses workbook.

2. Examine the May Expense Report worksheet. Identify the fields you will use to create the PivotTable and its accompanying PivotChart.

Create the PivotTable and PivotChart

3. Create a **PivotTable** and **PivotChart** together on a new worksheet.

4. **Rename** the new sheet with a descriptive name of your choice.

5. **Rename** the PivotTable as `May Expenses`.

6. Set up fields for the PivotTable and PivotChart so that the table and chart summarize the data by **cats/dogs** and then by **health**.

7. Set up fields so that the **shelter cost** and **veterinary cost** are calculated separately.

8. Format all numbers in the PivotTable with **Comma Style and no decimal places**.
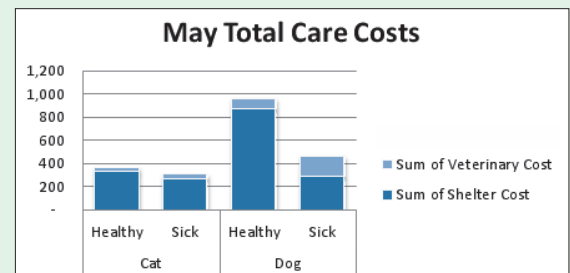
Format the PivotChart

9. Change the chart type to **Stacked Column**.

10. Apply a PivotChart **style** and a **chart layout** of your choice.
    When you finish, your PivotTable and PivotChart should match the following figure, except for field labels.

Your PivotTable displays one additional label. It was removed from this figure because it would display a significant part of the exercise solution.

Your PivotChart style and layout may differ from that shown.

	A	B	C
1		Sum of Shelter Cost	Sum of Veterinary Cost
2	⊟ Cat	594	75
3	Healthy	325	40
4	Sick	270	35
5	⊟ Dog	1,155	265
6	Healthy	869	90
7	Sick	286	175
8	Grand Total	1,749	340

May Total Care Costs

11. Change the **page orientation** and make any other adjustments necessary to fit the Pivot-Table and PivotChart on **one printed page**.

12. **Save** 🔲 the changes and **close** the workbook.

Create a Macro that Inserts the Date

*In this exercise, you will create a macro that inserts the phrase **Today's Date** in cell A1 and the TODAY( ) function in cell A2. The macro also will format the two cells. You will assign the macro to the current workbook only.*

1. Start a **new workbook** containing three blank worksheets.

2. Select **cell A10**.

Record the Macro

3. Begin **recording** a new macro.

4. **Name** the macro **TodaysDate**, assign the shortcut keystroke **Ctrl+Shift+D** to the macro, and store it in **This Workbook**. Your macro should record all of the actions in **steps 5–11**.

5. Select **cell A1**.

6. Type **Today's Date** into **cell A1**.

7. Enter the formula **=TODAY( )** in **cell B1**.
   This function displays the current date in the cell.

8. Left-align the date in **cell B1**.

9. Format **cells A1:B1** with size 12, bold, and a blue color for text.

10. Set the width of **column A** to **20**.

11. Select **cell B1**.

12. **Stop** the macro recording.

13. **Save** 💾 as a Macro-Enabled Workbook with the name **as-Today's Date** in the Lesson 12 folder in your file storage location.

Test the Macro Using the Ribbon Command

14. Display the **Sheet2** worksheet.

15. Run the macro using the **Run** command in the Macro dialog box.
    If your macro does not insert text, format the text, and widen column A as specified in steps 5–11, then delete the macro and rerecord it.

Test the Macro Shortcut Key

16. Display the **Sheet3** worksheet.

17. **Test** the macro using the Ctrl + Shift + D keystroke combination.

18. Have your instructor or a teaching assistant initial that you have successfully run the macro. _____

19. **Save** as **as-Today's Date** again and **close** the workbook.

Create Macros and Assign Buttons

In this exercise, you will create a defined name for a list, create two macros, assign buttons to them, and finally run the macros using the buttons.

1. **Open** the as-Holiday Donations workbook.

2. Display the **November Donations** worksheet, if not already displayed.

3. **Create** two macros for use in this workbook only and **assign** them to buttons as shown in the following table. The table describes the button text, macro names, and macro functions for each button. Position the buttons above the list in rows 3:4.

Button Text	Macro Name	Macro Function
Sort by Patron	Sort_by_Patron	Sort the patron list in rows 6–16 in A to Z order based on the patron last names and first names in columns A:B.
Sort by Details	Sort_by_Details	Sort the the patron list in rows 6–16 from largest to smallest based on the donation details in column D.

4. **Save** 💾 as a Macro-Enabled Workbook in the Lesson 12 folder in your file storage location.

Test the Macros

5. Manually **sort** the list in A to Z order by the type of donation in **column C**.

6. **Test** the Sort_by_Patron macro.

7. **Test** the Sort_by_Details macro.

8. Have your instructor or a teaching assistant initial that you have successfully run the macros. _____

9. **Save** 💾 again and **close** the workbook.

Critical Thinking & Work-Readiness Skills

In the course of working through the following Microsoft Office-based Critical Thinking exercises, you will also be utilizing various work-readiness skills, some of which are listed next to each exercise. Go to labyrinthelab.com/ workreadiness to learn more about the work-readiness skills.

12.1 Create a PivotTable and PivotChart

Dr. Edward Jackson, chief operating officer of Raritan Clinic East, would like a PivotTable and a PivotChart created from data to show a summary of patients' daily drug charges in each hospital station by doctor name. Open ct-Raritan Clinic East Patients (Lesson 12 folder). Look at the Patients worksheet. Title the list appropriately and descriptively. You will adjust column widths in a later exercise. Perform a two-column sort by Station then by Doctor. Insert both a Pivot-Table and PivotChart into a new worksheet and rename the worksheet **PivotChart**. Set up the PivotTable to display daily cost totals by station and then by doctor name. Format the chart for appropriate size and appearance. Save your work as **ct-Raritan Clinic East Patients [Your Last Name]**. Keep the file open.

WORK-READINESS SKILLS APPLIED
- Organizing and maintaining information
- Using computers to process information
- Seeing things in the mind's eye

12.2 View Details using the PivotChart

Dr. Edward Jackson would now like to see a summary of patients. Open ct-Raritan Clinic East Patients [Your Last Name], if necessary. Using options on the PivotTable Field List and the PivotChart, display the doctor specialty and doctor names, and then graph only Dr. Lawrence's patients. Resize and move the chart, if necessary. Format the PivotChart worksheet to print on one page. Save your work, and keep the file open.

WORK-READINESS SKILLS APPLIED
- Seeing things in the mind's eye
- Organizing and maintaining information
- Using computers to process information

12.3 Create Macros

You have decided to help Dr. Edward Jackson be more productive by adding macros the Patients worksheet. If necessary, open ct-Raritan Clinic East Patients [Your Last Name]. On the Patients worksheet, create a macro to automatically insert today's date in cell H1 and right align it. Create another macro to autofit the column widths. Test the macros by running them. Then, save as a macro-enabled workbook. Close your file when you are finished.

WORK-READINESS SKILLS APPLIED
- Showing responsibility
- Making decisions
- Selecting technology